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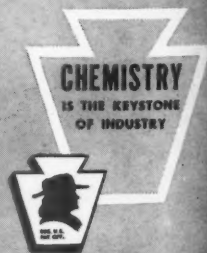


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PAPER

and

WOOD PULP

SELLING AGENTS

BULKLEY, DUNTON PULP CO.

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Making More With Less

With the expanding War Program demanding more and more production of Pulp, Paper and Paperboard with the use of less and less of the strategic materials, American ingenuity has been called upon as never before.

It is responding patriotically with many ideas to "Keep 'Em Rolling" with a minimum of materials. Here are shown a few of the ideas now employed by mills on the Pacific Coast to save on scarce materials and to make what they have last longer.

A LONG with the patch on the seat of his pants the boy on the cover is probably receiving some good advice from his mother to the effect that he should take better care of his clothes. To make her advice stick she may be telling him that "Waste not, want not," is a maxim he ought to have before him all through life. For good measure she is probably adding, "An ounce of prevention is worth a pound of cure," or "A stitch in time saves nine."

The idea back of these old sayings is uppermost in the minds of all connected with the pulp and paper industry on the Pacific Coast today. The insatiable demand of the War Program has created shortages in a large number of materials which were formerly obtainable on short notice. Conservation of present equipment and materials plus the salvage of worn out equipment for reuse receives first attention in all our mills today. "An ounce of prevention . . ." was put another way by a maintenance man who said, "A few pounds of welding rod can salvage hundreds of pounds of valuable metal, save precious machine shop time and keep the mill running without lost time."

Before the war the repair and salvage yardstick was the cost of repairing or salvaging balanced against the cost of a new part or new materials. Today the yardstick is, "Can it be repaired or salvaged at any cost?"

Since we entered the war there has been great emphasis laid upon the need to conserve materials. There have been radio programs, newspaper and magazine articles, bulletins and speeches on the need to conserve and salvage. Everyone recognized it was an important, in fact vital part of our Victory Program. But little has been said or printed about industry's response to these pleas.

Industry in general is the big user of materials. What is industry's response to the program of conservation and salvage? Specifically, what are the mills on the Pacific Coast doing to "Make More With Less?"

The answer is this. The pulp, paper and paperboard mills on the Pacific Coast, whose production is, on the whole, most vital to our War Program, are doing everything that human ingenuity can devise to save and salvage their present equipment and materials. That statement is not made from any desk investigation but is generalized from a large number of conservation and salvage practices uncovered in a field investigation by PACIFIC PULP & PAPER INDUSTRY'S organization, extending from one end of the Coast to the other. Executives, operators, maintenance men, shop men, supply and equipment salesmen were interviewed in a search to uncover the little ideas on how to save and reuse materials that mean so much to our country today. A little saved here and a little more saved there soon counts up to sizeable totals of scarce materials made available for the War Program.

Primary Purpose of Survey

● The primary purpose of the investigation was to provide a timely service to the industry and to the country by compiling and publishing as large a number as possible of these conservation and salvage ideas as a pool from which each could benefit from the ideas of others and the entire program given impetus. The mills cooperated splendidly giving freely of their ideas as did the manufacturers of equipment and supplies. Pictures were taken on the spot by the journal's men to project the conservation or salvage ideas more clearly to others.

This roundup of ideas makes no pretense of being complete for the operating and maintenance men could not think of all the different ways in which they are conserving and salvaging at the time they were interviewed. Nor did time permit an exhaustive survey. Moreover, the situation is dynamic in that new ideas are being developed almost daily, some out of sheer necessity and others out of intensive study of the possibilities of extending conservation and salvage. The ideas and photographs which follow are representative of the practices and attitudes of the mills on the Pacific Coast and also of a number of supply and equipment producers.

Many of the practices appearing here are not new in the plants using them. Some may have been employed for years. But today's conditions have increased their value manifold. On the other hand these same ideas will probably be new to a number of other plants. No segregation has been made of new and old ideas for they all serve the common aim of conserving and salvaging that we may win this war as quickly as possible.

A Patriotic Attitude

● During this field investigation one thing stood out, the attitude of the mill organizations toward the use of new and scarce materials. All through the industry, even in those mills whose production is of direct importance to the War Program, was found the desire to make what they had last as long as possible and then to reclaim it for another mill use.

"Although we could probably obtain needed priorities for materials essential to our operations," said one maintenance man, "we feel we should not ask for it until every possibility of repair, substitution or salvage has been exhausted. When we do ask for material to keep running it is only because no alternative remains." His statement sums up the general attitude of the pulp, paper and paperboard mills on the Pacific Coast. Their desire to contribute to the winning of the war not only through continued production but through material savings as well, is undoubtedly common throughout the entire American industry, and will aid greatly in bringing the war to a successful end.

Ideas From the Mills

● The ideas of conservation, substitution and salvaging given below are taken directly from mill reports. Some of the ideas have been illustrated with photographs. All have proved useful to the mill reporting them and will undoubtedly find application in many other plants.

"Stainless steels in sheets and bars and in cast shapes were solving many problems of corrosion, cleanliness and brightness of pulp when this material became limited and then not available to us.

"Our first problem of substitution for stainless steel was in pulp sliver screen plates. One-half inch thick Micarta sheets (available on an A-10) with drilled holes were installed and have proved quite satisfactory. Stainless steel linings for wood head boxes and flumes have had to be discontinued. Bird screen feed boxes of dry redwood varnished are found to resist slime deposit. Creosote treated fir cleans more easily than plain fir and, of course, lasts longer. In place of stainless steel or copper, rods in vent chamber and acid tanks we will probably have to use lead coated steel as a temporary substitute.

"Copper was proving a most satisfactory material for stock pipe and fittings requiring a minimum of cleaning. Creosoted fir pipe was substituted with cast iron or fabricated steel fittings rubber lined. Now, in place of rubber lining we will return to our previous practice of sandblasting and painting with white synthetic enamel. And we may have to soon substitute some other coating material. Painted steel is also being temporarily substituted for copper and bronze on fourdrinier parts.

"For wood pipe connections we have used cast steel flanges and two rods from flange to flange. We are now using sheet metal inserted sleeves and black annealed wire ties put around the regular pipe bands and twisted tight.

"Creosoted fir pipe is being used to replace a section of redwood pipe which would normally be replaced with Armco iron.

"Wood stationary decks on fourdrinier wires are being substituted for sheet rubber.

"All iron pump parts in contact with stock were being replaced in bronze. Now we will revert to temporary replacements with cast iron.

"An experimental joint between ends of salvaged tubing, to save welding rods, was made by wrapping the joint with tape, then with salvaged steel wire and a couple of rings of candlewicking. Around the 3½-in. tube was poured an 8-in. square block of concrete. This joint stood 90 lbs. water pressure without leaking.

"A substitute for new bronze bushings and bearing liners is being tried. The bushing is made by wrapping several turns of worn out fourdrinier wire around a mandrel, putting it in a mould and pouring reclaimed babbitt metal around it. We have not used this long enough to determine its merit. Lead in place of babbitt is going to be tried in some places.

"Rubber covered steel rolls have been substituted in place of aluminum and brass tubing. Probably the next substitution will be enameled steel and possibly wood for the shorter felt rolls.

"A collapsed timber retaining wall, which would normally be replaced with reinforced concrete, will be repaired with timber, part of it creosoted.

"In our salvage department we have been reconditioning all possible bolts and nuts even at a labor cost above the cost of new ones.

"All discarded steel shapes, plates, sheets and bars are being carefully inspected and re-usable parts saved.

BEARING of fourdrinier wire and babbitt or lead. Scrap bronze fourdrinier wire, 60 mesh, is wrapped around a mandrel the size of the bearing desired, to a thickness of 1/16-inch. Molten babbitt or lead is poured around the wire producing the finished bronze lined bearing shown at the left.

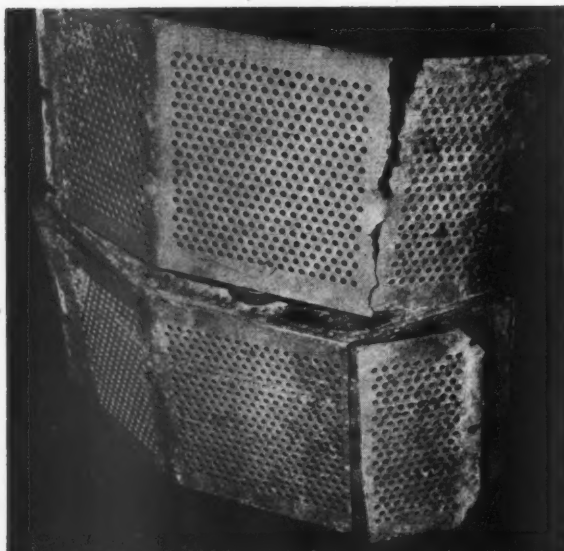
CONVEYOR BELTS are saved by patching damaged sections or cutting them out and vulcanizing the ends together on the job as is being done here.

WOOD GRATING outwears iron claims one mill. As the familiar iron grating wears out it is being replaced with ¾ by 3-inch lumber on edge as shown, making a safe, long-wearing floor grating.





SCRAP PILE—The Pulp and Paper Industry's source of metals in war time. To avoid requesting new metals the Pacific Coast industry's ingenious operating and maintenance men are examining every piece of scrap for possible repair or adaptation to a different use in maintaining maximum production. Metals that cannot be reused at the mill are sold for scrap. By "Making More With Less" the mills are contributing doubly to the war program.



"Pieces of reinforcing bars are separated from any concrete cut out, and are straightened and used again.

"All babbitt metal is being carefully conserved and re-used only in places where this metal is necessary."

Another mill reports:

"The copper overflow pipes in the Barker Tower are now being replaced as needed with lead pipes.

"Old discarded stainless steel beater tubing is used in place of a smaller size copper tubing.

"Reclaimed babbitt is used in the place of bronze bushings.

"Steel shafting, where possible, is being built up by electric welding.

"Iron bolts, chromium plated, are used in place of bronze bolts for the blowpits, and also in place of stainless steel.

"Using sulphite pulp in place of rubber gaskets on the acid tanks.

"Using paper mill jacket in place of rubber gaskets on pipe lines.

"Building up the stainless steel sleeves with Stellite for the circulating pumps.

"Flame hardening steel for the wearing parts on the chipper.

"Using old paper mill felts in the place of new cotton duck for side curtains on the machines.

"Using galvanized lag screws and nails in place of copper screws and nails in the wet room.

"Using cotton duck for conveyors wherever possible, in place of the rubber belting.

"Using fine water sprays on rubber belt for handling chips, to prolong belt life.

"Plastic paint is used in a number of locations, particularly around the beaters and machines, in the place of sheet copper, Monel metal, etc.

"Using concrete reinforcing iron in place of iron rod for hangers.

"More frequent cleaning and varnishing of motors.

"More thorough inspection of all mechanical equipment, and additional use of lubricating oil to avoid friction and wearing of moving parts.

"Have established a definite program for the salvaging of metal formerly going to our scrap pile.

"We are now making a thorough survey of the entire plant, for the removal of all unused pipe, fittings, conduit, etc.

"In addition to this, we are planning to purchase valve re-seating tools to prolong their life.

"Plan to replace the worn out aluminum plates at the waste liquor basin with a re-designed flow arrangement, using wood construction.

"Have started work of moving the inclined screen for the reclaiming of screenings, so as to eliminate the use of a conveyor.

"Plan to change the wood car track system to avoid excess damage to the iron frame cars."

From another plant:

"Consideration is being given to many possibilities, some of which are resin-bound plywood for fan blades, glass lined and covered pipe to replace stainless pipe, and masonite or plastic sheets to replace sheet metal in some applications. Also there is the recourse to wooden doctor blades in place of the more scarce Micarta blades for wire rolls.

"One application that has given more or less satisfaction here is plastic covered mild steel blades on Jensen exhaust fans rather than use of non-corrosive metals.

"In the field of salvage and idle equipment, much has been done. All materials of no value as spares or of no immediate salvage value have been separated from the spare equipment.

STAINLESS STRAINER PLATES and frames are salvaged by sulphite mills through welding of the good sections of two or more into one good one.

MILD STEEL PUMP SHAFT is built up with stainless steel by are welding.

BRONZE SPRAY built up these Hayton pump sleeves. The sleeve on the left is finished, the one on the right is still rough.

USED FLANGES helped produce this home made 8 by 8 by 14-inch "T" pipe fitting plus a 14-inch drill casing and a piece of 8-inch pipe. To be used in a water line.

The spare equipment has been quite thoroughly classified and stored under cover in the warehouses.

"This mill has made a practice of salvaging all brass, copper, lead, babbit and high quality steels.

"To save steel the wear plates in the wood mill and chip plant chain conveyors are lubricated with water to cut down wear, and side plates are turned when worn through on one edge.

"Our efforts have been mainly in the direction of saving and getting the most out of the materials on hand and equipment in use.

"This is largely by means of more rigid inspection, along with filing of inspection data and systematic analysis of this information and consequently prompt repair to any weaknesses that develop. Prompt repair of small items prevents future breakdowns and failure of hard-to-replace materials.

"Special attention is being given lubrication which is most important in life of bearings. The regular mechanical inspection service is used in connection with the lubrication department to insure all bearings adequate lubrication with the proper oils or greases."

A fourth mill says:

"Re-use of rubber belting. By this we mean taking rubber belting not suitable for important drives and using it on lesser important drives.

"Use of camel hair belting in place of rubber belting.

"Use of leather belting in place of rubber.

"Use of plywood for guards and steel shapes in place of steel.

"Welding or building up by welding of worn parts.

"Re-use of old metal, such as salvaging of babbit and miscellaneous discarded equipment.

"Use of steel or cast iron in place of stainless steel or bronze.

"Old fourdrinier wires cut down for deckers.

"Welding of broken screen plates.

"More attention given to lubrication of all equipment, particularly chains. Fuel oil can be used as a lubricant on certain fuel chains, and it works very satisfactorily.

"Reduction in wear on equipment by shutting down all equipment when not in use.

"Use of painters to do more cleaning and protecting material. To do this we eliminate as much as possible painting large concrete areas and concentrating on equipment.

"Use of wood pipe in place of steel in water lines, when possible."

A fifth mill does these things:

"For copper pipe and fittings we are substituting steel pipe wood lined where necessary. For stainless steel we are using stainless metal spray over iron or steel. Instead of new steel plate we buy second hand plate when necessary. In place of aluminum we are using steel.

"Steps have been taken to salvage materials on the following items:

"Drills—An attachment was purchased for regrinding dull drills.

"Rags—Drums were placed around mill and dirty rags are collected and re-washed.

"Files—Acid solution used to clean files and take off burrs; most are then re-used.

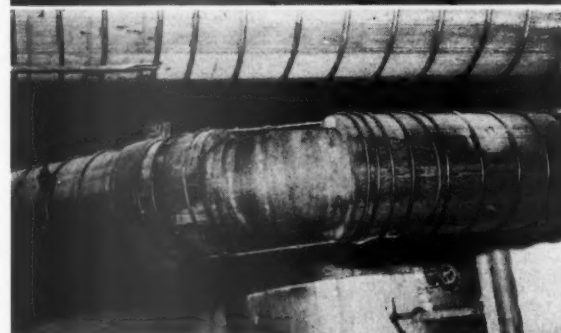
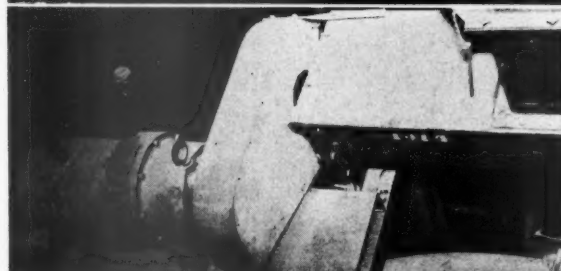
"Babbit—All cuttings and old linings are being re-melted.

OIL LINE of Saran plastic tubing on the left replaces scarce copper tubing (the two on the right) on a flat screen. Saran tubing, made by The Dow Chemical Co., is now available in sizes from $\frac{1}{8}$ to $\frac{3}{4}$ -inch in diameter.

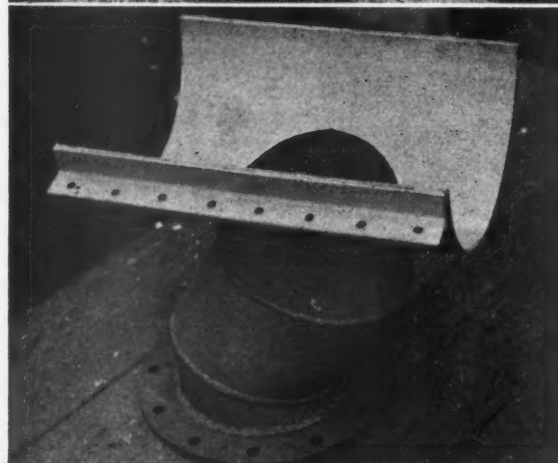
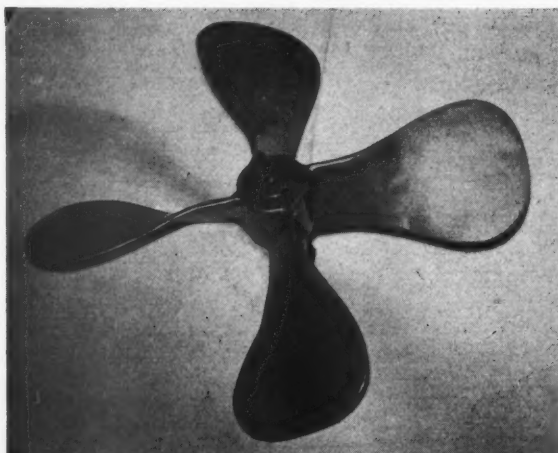
WOOD MACHINERY GUARDS replace the sheet metal. Here is shown a salt cake screw conveyor drive guard of $\frac{1}{4}$ -inch plywood with edges of hand sawed dimension lumber.

WOOD STAVE PIPE is widely used for stock and water lines in Pacific Coast mills. The conventional flanged couplings with steel tie rods is shown here. In the two other pictures is shown the method adopted by one Coast plant.

FLANGES AND TIE RODS eliminated from wood pipe connections to save the steel. Sheet metal sleeves are beaded close to the ends, inserted in the wood pipe and held firmly by the standard bands. They are further secured by the heavy gauge wire welded to the sleeve and wound around the band.



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"Valves—All old valves are collected and only necessary new parts used to re-condition.

"Taps and Reamers—Larger sizes have been sent out for re-grinding.

"Reduction in total amount of repair materials used, has been accomplished by eliminating all but essential maintenance jobs."

● The following is an extract from a report of a group meeting on maintenance and materials:

"The only question formally presented was 'What metals can be substituted for aluminum or stainless steel for screening hot liquor from sulphite blow-pits?' No metal, not already on the restricted list, can be substituted with assurance of a reasonable life or performance. It was recommended that perforated wood planks, covered with cocoa matting be used until the emergency passes, and stainless steel again becomes available. A method of fastening down the stainless steel plates of drainer bottoms was suggested in this discussion. Instead of using lag screws a strip of stainless steel two inches wide can be welded over the joints.

"To what extent have bi-metals such as 'Ingaclad,' 'Croloy,' 'Pluramelt' been used, and how successful has this been? It developed that little use has been made of such 'clad' metals, but because they are cheaper than solid alloy sheets, and yet retain the virtues of a solid sheet, they can, within the definition of the OPM, be used if obtainable. One plant in the past has used 'Ingaclad' for paste-making tanks. These tanks have stood up very well. The 'Ingaclad' is of 3/16-inch steel plate and 1/16-inch stainless steel. Another mill also uses 'Ingaclad' for digester cover plates with good success.

"Have you been able to get motor and other electrical equipment repaired under present conditions? It developed that most mills have spare windings or armatures on hand to repair motors and generators. In rewinding motors and fields of D.C. motors and generators, it is recommended where possible, that glass insulation be specified for the windings. This does not deteriorate under the atmospheric condition found in our mills. It also allows overloading to a reasonable degree without any serious consequences. A 10-hp. motor can be operated up to 12 or 13-hp. without damage, and a 75-hp. motor up to 100-hp.

"Where a mill is limited in space, for the installation of chip screens, what is recommended to get more capacity? This was posed by a mill which uses a Niagara type Tyler screen. It developed that one other mill with the same problem, widened its screens twelve inches and used screen plates with rectangular instead of square or round openings. Also, galvanized screens outlasted black iron screens many times.

"Are automatic draft controls of boilers justified? One mill has just installed Republic type of air diaphragm controls, and has achieved excellent results over manual control. The approximate cost per boiler is \$350.00.

"Can further standardization of any parts be effected to lower inventory and repair parts? It was thought that some further standardization could be done on 'V' ropes, conveyor parts, and life-time sealed bearings for conveyor parts.

CELLULOID and acetone have been used to coat this Jenssen tower exhaust fan against corrosion. Similarly coated fans have already been used as long as six months at this mill and it is expected that as a result of the experience gained the life can be brought up to one year.

BARKER YOKE reclaimed by welding. This Stetson-Ross power barker main yoke with bearing housing was reclaimed after the wood carried around by the cutter head had worn it nearly through. Of cast steel the yoke was built up with mild steel rod and washed with phosphor bronze for wear, which explains the brightness. It was completely re-machined to obtain accurate bearing alignment.

CHLORINATED RUBBER PAINT on this fabricated black iron pipe saddle fitting for a stock line replaces previously used stainless steel or Everdur. Other corrosion resistant coatings will substitute for chlorinated rubber paint when present stocks are exhausted.

FLANGES ARE CUT OFF stainless steel fittings that are beyond reclaiming and welded to good pieces of stainless pipe.

"Grinder shafts for pulp stones. Why are these replaced now and how could their useful life be extended? The discussion brought out the facts that it might be possible to extend grinder shaft life by (1) more carefully lining up; (2) using a new type of rubber block in the couplings; (3) using mild steel shafts with a low carbon content. It also developed that metallizing journals when worn, might extend the shaft life.

"After disposing of the questions and answers, open discussion was carried out on the following:

"Greater use should be made of new tools and techniques in metal working. These include metallizing, flame hardening, hard-surfacing metals, and new welding techniques.

"Welding leads in 'first aid equipment' in the emergency, for the building up of fittings—the joining of pipe, plate work and structural steel. For cheapening such work, and all work requiring acetylene gas, it is suggested that low pressure gas made from carbide, be used instead of gas in cylinders. Such gas from carbide is hotter (consequently less is used) and is much cheaper per cubic foot than high pressure gas in cylinders.

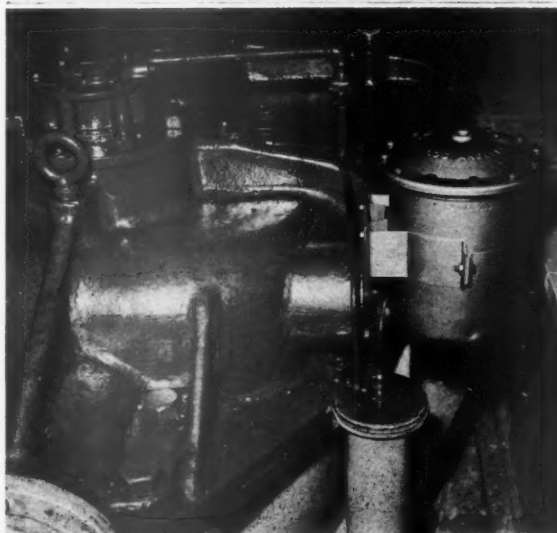
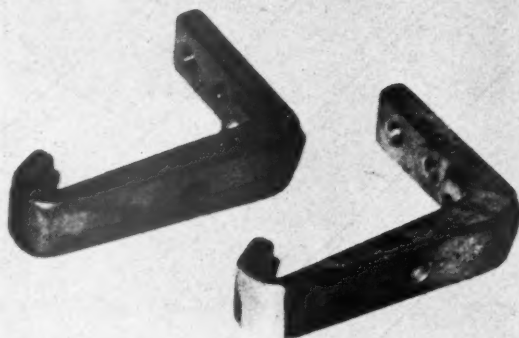
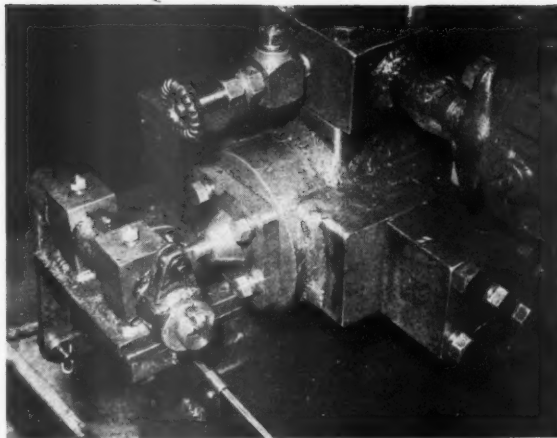
"Flame hardening, using the proper low-priced steels, is a good method, falling within the ruling of the WPB for making hog knives, barker knives, and hardening gears and pinions (simulating tool steel) and for hardening surfaces subject to abrasion, such as chip hoppers, conveyor parts, etc.

"In much the same manner but with a different technique, valve seats, discs and other surfaces can be built up by applying 'Stoodite'—extending the life of a valve or article many times.

"Metallizing is distinctly a tool and technique for 'first-aid work,' restoring worn surfaces of journals, crank shafts, pump plungers, impellers to sound working conditions. Shaft sleeves and packing gland fits can be built up of bronze or stainless steel on a cheap cold rolled shaft and obtain the equivalent of an all stainless steel shaft so far as being resistant to corrosion and wear is concerned.

"Metallizing is also a method of building up corrosive-proof protective coatings on felt rolls and other rolls performing similar service, and on surfaces subject to accelerated oxidation such as boiler breechings.

"Plating is still available in copper and chromium and this type of substitution for solid materials can be resorted to in the emergency. Chromium plated Witham shower buttons outlast



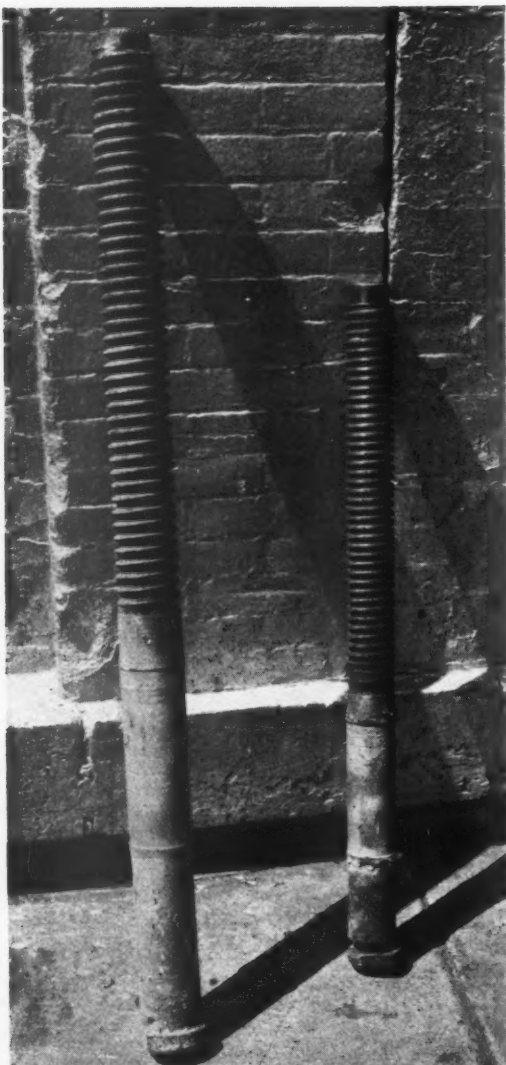
BALING PRESS 4-WAY VALVE made in the mill shop in an emergency when the original cracked under 2500 pounds pressure, proved so satisfactory that a duplicate was made for another press and the second original equipment valve put into stock as a spare. This is a 4-way neutral center control valve.

CONTACTORS reclaimed by brazing. These motor line starter contactors were worn thin at the elbows. Bronze was applied and they were machined to the original size. The mill doing this repairs about 50 contactors a year, saving ½ pound of bronze each by reclaiming. This example emphasizes the care the maintenance men in Pacific Coast mills are exercising daily to save every bit of metal for the War Program.

OIL FILTER on 50-h.p. bleach cell drive made in the shop appears in the lower part of the picture and a drawing of its construction is shown elsewhere in this issue. This simple filter, uses pieces of old felt jackets as the filter medium. Before the filter was installed the 55 gallons of high grade oil had to be changed every six months. Afterward the oil was still good at 2½ years. The larger unit is the new filter replacing the smaller, and known as the Luberfiner. It cleans as well as filters and is said to restore color and viscosity.

THE BULL CHAIN is a key point requiring regular maintenance for the logs must be kept coming into the sawmill or break down plant. In one mill about 30 feet of the chain is removed at a time and taken to the shop. The inside bearing surfaces of the links and the outside of the shanks of some links are found worn and in need of building up and hardening with an acetylene torch.

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the plain type many times, save materials and water and improve operations.

"A lengthy discussion can be developed around the matter of pipe and fittings—their upkeep, replacement and substitution. Where alloy pipe is now being used and cannot be obtained for replacement, it is recommended that so far as possible, we should return to the materials in use before the advent of stainless steels, lead or wood, bound with copper—or leadized steel bands or wire. One mill is using wood pipe for sulphite blow piping in the straight runs. Such blow pipe is bound with leadized bands.

"Where lighter weight pipe can be substituted, it should be so substituted.

"Lined steel pipe can be substituted in some cases for alloy pipe. The lining can be of glass, rubber or cement. One such pipe called 'Durolite' (cement lined) is an excellent substitute for alloy piping for handling caustic, white and black liquor in kraft work. Transite pipe for water is a satisfactory substitute for steel, but this type of pipe is not satisfactory for pulp as it tends to slime.

"Welded pipe fittings should be used in place of expensive cast fittings and flanged piping. A saving of $\frac{1}{4}$ to $\frac{2}{3}$ the cost of such cast fittings and pipe can be effected, as well as complying with the rulings of WPB.

"Heater tubes and piping that have become worn at the ends only, can be salvaged for further use by gas welding together short pieces to form longer lengths.

"In place of conventional saddle pipe hangers, use can be made of a short length of bar with a hole in it, welded to the top of the pipe for supporting the line with one bolt instead of two. This makes a neat job—and the covering around such hangers is more easily applied.

"Paints, properly selected and applied, is one way we can extend the useful life of metals where such are used structurally. It is a subject far greater than can be disposed of in a few minutes discussion but a start should be made in each mill toward the use of longer-lived paints for protection.

"Lubrication of the machinery in our mill is all important to 'keep 'em running.' Do not experiment with lubrication in important machinery. If your knowledge of lubricants is not sufficient to get you over a difficult problem involving lubrication, call in an expert from one or more oil companies with whom you deal.

"We should all be 'on the alert' for new small tools and devices which make repair work easier, better and quicker. Portable jacks and pullers for pulling gears, pinions, bearings, etc., beat the old method of using rods, bars and hammers. Lightweight and inexpensive A.C. welding machines are now available in place of the conventional M.G. machines. The Westinghouse company is bringing out a portable balancing machine for balancing revolving equipment in its own bearings. This machine will be very useful to our mills. The General Electric Company is bringing out a thickness gauge for measurement of the wall thickness of metal structures. This is not yet developed for measuring curved surfaces such as pipe or digesters, but presumably will be.

"In closing, the group discussion, it is suggested that operating superintendents and personnel can be of inestimable value in the campaign ahead of us, to make what we have access to, go as far as possible. This they can do by calling attention to the maintenance and repair crews of conditions, which if remedied immediately, will prevent a damage or shutdown. Invariably a damage to a machine calls for larger than ordinary amounts of repair materials.

"Let's really 'make MORE and MORE with LESS and LESS' until the passing of the emergency restores to us access to what we now consider we need."

● An additional mill report:

"Valves—Replacement seats and discs for stainless steel valves which we ordinarily purchase from the manufacturer we are now fabricating from discarded stainless steel pipe and remnants of stainless steel plate. The seats are made by cutting off a ring of pipe and forging it to the approximate size, then building it up with arc-welding. The discs are made by forging a small piece of stainless steel plate into the shape of a sphere,

BLOW VALVE stems which have been built up with sprayed stainless steel. These would otherwise have had to be scrapped. As shown they are ready for finishing.

SCRAP PIPE was used to build this 16 by 14-inch reducer in the groundwood mill water line.

after which a short piece of bar stock is welded to the concave side to receive the stem. The portion of the disc which engages the seat is built up with arc-welding. The disc is then machined in a lathe.

"We have even fabricated small Y valves out of standard pipe. The flanges are formed by welding a mild steel flange to the stainless steel pipe and building up the portion inside the bolt circle with stainless steel welding, thus minimizing the quantity of stainless steel required.

"Chippers, Barkers and Hogs—Worn out chipper knife holders which were formerly discarded are now being built up with arc-welding to the original dimensions, after which they are remachined and the loss of thickness is taken up by shims.

"The chipper anvils which are worn convex are reground and shimmed out with steel plate.

"The barker cutter heads are practically never discarded, no matter how badly damaged. A head which had thrown a knife had one lip so badly deformed that it was necessary to remove it and weld in a new piece of steel. The head was then remachined and put back into service. We have considerably reduced the hazard of thrown knives by using a knife that is slightly thicker at the butt than at the tip. Instead of throwing itself out of the head when the gib loosens the wedgelike section of the knife causes it to automatically retighten. This improvement has greatly reduced knife loss and head damage.

"We are now building up the face of a discarded hog disc with arc-welding and it is expected that after machining this disc will be as good as new.

"Pipe—We are experimenting with a substitution of plywood for copper wire winding on wood stave pipe and the bands used on tanks which are not subjected to high pressures. The pipe is wrapped with several layers of thin plywood bonded together with water resistant glue. The outer layer is secured with wood screws.

"The bands on wood stave pipe which is buried or close to the ground frequently deteriorate to the point where it is unsafe to operate the pipe line. If the wood is found to be sound the pipe is uncovered and concrete is poured around the pipe in a rectangular section. This is quite inexpensive compared to installing new pipe and it arrests further deterioration of the bands and gives additional reinforcement to the pipe.

"We plan to use porcelain pipe and valves whenever possible in locations where stainless steel or copper pipe has previously been used.

"Plywood—We have made an effort to use plywood whenever possible in the fabrication of ducts, hoods, and in other locations where sheet metal formerly was used.

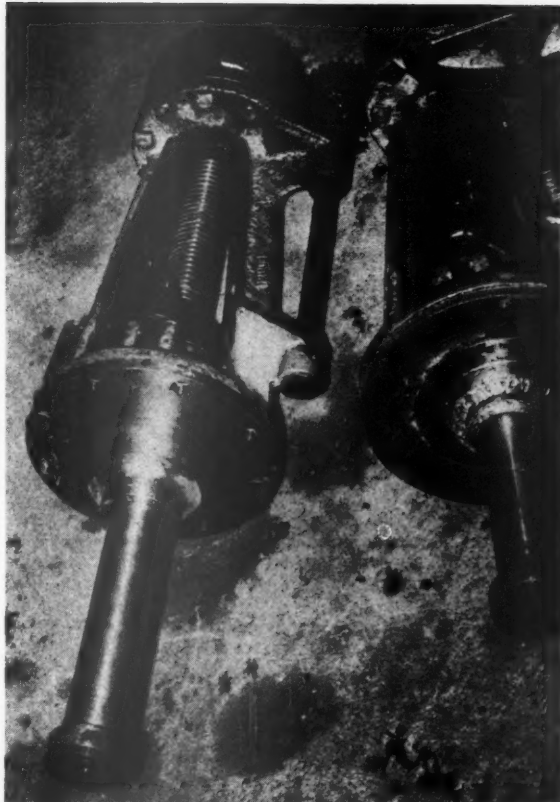
• More valuable ideas:

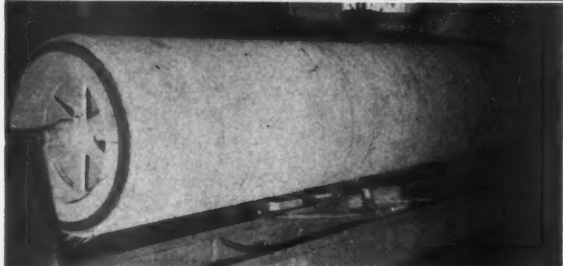
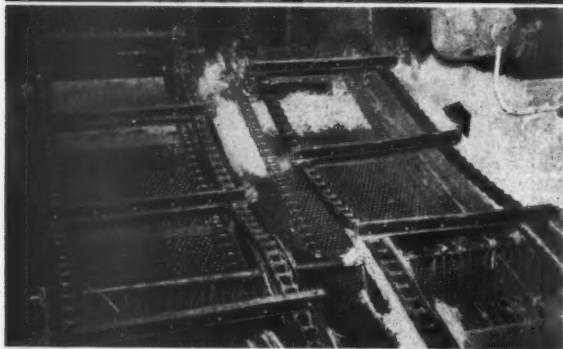
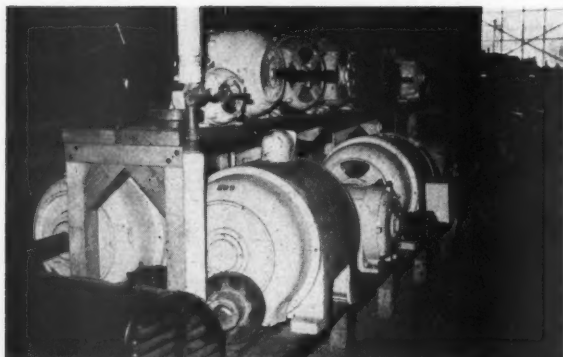
"Our program of material conservation as yet contains few outstanding examples of radical substitutions adopted to obviate use of critical materials. It consists rather of a general intensification of the salvaging program which we have followed for some years, the object now being, of course, to reclaim all usable necessary material regardless of cost, whereas in normal times much potentially usable material is discarded because the labor cost does not justify reclaiming. So far, we have salvaged many tons of steel plate which, in normal times, we would discard.

OLD STAINLESS STEEL 3-inch pipe saved these sulphite blow valve stems from becoming scrap. The corroded section of the bronze stems was repaired by pressing on a piece of reclaimed stainless pipe and a piece of stainless was welded on the end. Most Pacific Coast mills use every bit of stainless welding rod by welding short pieces together into one of the proper length. Likewise stainless cylinder mold winding wire is reused in metal spray guns.

BEATER dump gate lift was built up with mild steel and coated by Stoddy self-hard. As shown it is ready to be finished.

STAINLESS INLAY permits use of plain steel flanges on stainless steel pipe. Pipe is welded part way into flange. Flange is cut back $\frac{3}{4}$ inch from center rim and $\frac{3}{32}$ inch deep and filled with stainless steel joining with the pipe on the other side.





"For instance, at one mill we are constructing a boiler breeching from steel plate obtained from a stack recently demolished. The plates have to be rolled flat, sandblasted to remove heavy scale, trimmed to uniform shape, then fabricated for use in the breeching. At another mill, we have salvaged many tons of steel from one large stock tank agitator and are using this for repairing a steel chip hopper. In normal times the additional time and increased labor cost entailed in so conducting the demolition as to obtain sections of plate in usable sizes would not be justified.

"A notable development is the salvaging of stainless steel heater tubes by cutting off damaged or defective sections of the tubes and welding together the remaining good parts to make full length tubes. The welding procedure adopted at this mill produces excellent welds and the salvaged tubes so far produced and installed in the heaters appear to be very satisfactory.

"At this mill, also, we are using digester blow pipe consisting of a thin rolled stainless steel liner surrounded by a mild steel plate jacket. The weight of stainless steel required for this construction is only a small fraction of that necessary for the cast stainless steel pipe which is widely used in sulphite mills.

"In some applications we are using glass lined mild steel pipe and fittings instead of copper pipe and bronze fittings, but have not yet had sufficient experience with the substitute material to be able to compare it with the materials originally used. This construction has the advantage that it may be possible in many cases to apply a new glass coating when necessary, without replacing the metal pipe or fitting and this, of course, eliminates the recurrent use of metal for replacement.

"We have in recent years found it necessary to adopt chromium stainless steel covers instead of bronze covers on our pulp machine press rolls, but are now unable to follow this practice due to the scarcity of chromium. In the case of one press roll, a complete new cover was necessary, and since bronze is almost as critically scarce as stainless steel we decided to spray on a coating of 18-8 stainless steel. We cannot be sure of the success of this operation until the roll has been in use for a considerable time, but present indications are promising. The spraying operation required 160 lbs. of 18-8 stainless steel wire whereas a stainless steel cover would have a finished weight of 1400 lbs., and a bronze cover in the finished state would weigh over 1600 lbs. We are also using metal spraying equipment for building up worn parts which would otherwise have to be discarded."

● More mill ideas:

"All obsolete and unused machines are being wrecked and scrap cast iron, scrap brass and scrap felts are being shipped and sold to junk dealers.

"Babbitt metal is being salvaged from obsolete machines and bearings. The babbitt is being chipped out instead of melted out, wherever possible, to avoid degradation of the babbitt. Used babbitt stock is segregated so that the better grade babbitt can be used on the heavy duty bearings, which under normal conditions would be re-babbitted with new babbitt. Babbitt

HEATED SPARE MOTOR RACK keeps the windings dry and prevents shorts when the motors are placed in service. Steam coils run down center line of rack between motors.

MICARTA SCREEN PLATES instead of stainless steel on these groundwood sliver screens. Westinghouse Micarta, 1/2-inch thick, is used on the screens shown and is available on an A-10 priority.

DECKER COUCH ROLL made at the mill of wood, turned in lathe and covered with used dryer canvas. Mill reports very satisfactory operation.

OLD VALVES cleaned, repaired and placed in storeroom for emergency use.

DOUBLE SKIRT on chip chute discharge from chipper onto rubber conveyor belt. To prevent wear of belt by riding of rubber skirt it was moved toward center and raised 1-inch off belt. A second skirt of wood was placed near edge and about 1/2-inch off belt. These shown have not proved high enough and will be raised. Rubber companies say that conveyor belt life can be extended by discharging onto belt 18 inches from idlers. Discharging onto belt directly over idler pounds belt as upon an anvil.

linings are also reconditioned by building up the worn surface.

"Rubber hose and portable electric cords. Employees are educated to avoid unnecessary rough usage and to keep oil and grease off the rubber. New hose is used on high pressure service. When the hose is no longer serviceable on high pressure lines it is transferred to low pressure service.

"Rubber covered electric wire. This is segregated and both used and unused short lengths are stored.

"Steel shafting, structural shapes and plate. Shafting is being salvaged from all obsolete and unused machines. It is sorted, marked and stored for use on essential maintenance. Where practicable worn shaft journals are built up to size by metal spraying.

"Where possible wood is substituted for steel structural shapes and plate. All short ends, trims, etc., of steel are sorted by sizes for use as required.

"Employees are being educated not to cut a small piece from a larger piece which may be impossible to replace.

"A useful 'kink' in the conservation of brass doctor blades is to braze a strip of steel to the brass blade which has been worn too narrow for further use. In this manner additional life is obtained from the narrow doctor.

"Some substitutions suggested by one mill engineer are soft iron corrugator fingers for bronze, cast iron bearings in place of bronze, particularly in the slower speed operations; wood substitutes for steel sheets, plates and other structural parts; and utilize more of the scrap pile for items such as steel shafting which can be turned into smaller shafting and gears.

"Another mill engineer cites a particular use of the scrap pile, when his organization built a conveyor in connection with the automatic taper. The large drums which carry the belt were made from two worn out 'V' belt pulleys which were formerly on the breaker beater drive. The 'V's' were turned off from the pulley to make a flat surface. A piece of an old corrugator belt was used as the belt part of the conveyor.

"The following suggestions come from another mill engineer:

"We have successfully employed the practice of building up chipped and worn gear teeth.

"We have substituted chromium plated Witham shower buttons in all of our cylinder and felt showers. We have found that any hole in a bronze pipe erodes very quickly and become extremely wasteful of water and power. The chromium plated holes retain their normal size for a much longer time. This applies equally to patented showers and to ordinary perforated pipes.

"Wire ropes on cranes receive the most severe wear at the ends which are constantly working in sheaves while the portion toward the drum end receives much less wear. By installing long lengths, we find it necessary to remove only a comparatively short section from time to time. Previously we installed an entire length of new rope just sufficient for the job, then removed the entire length when any part became unserviceable.

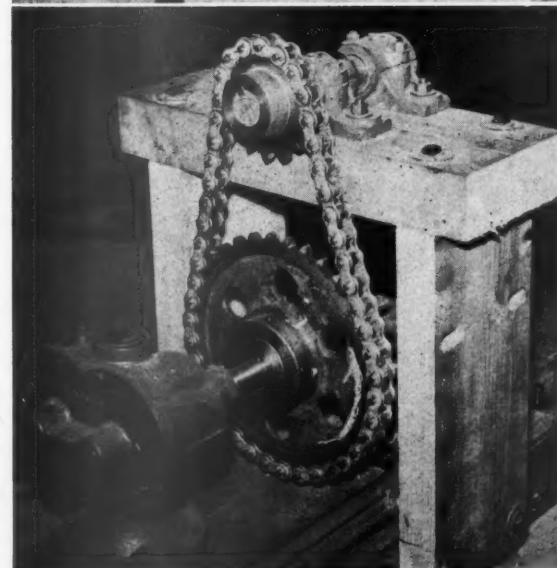
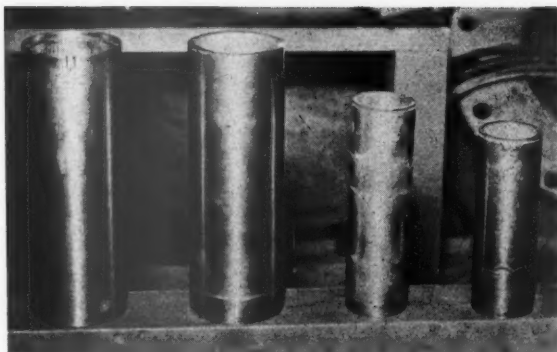
"All of our felts are wider than our press rolls and the edges of the felts therefore, rode on roll shoulders. We have

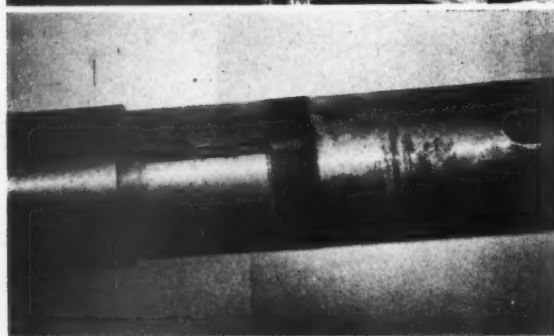
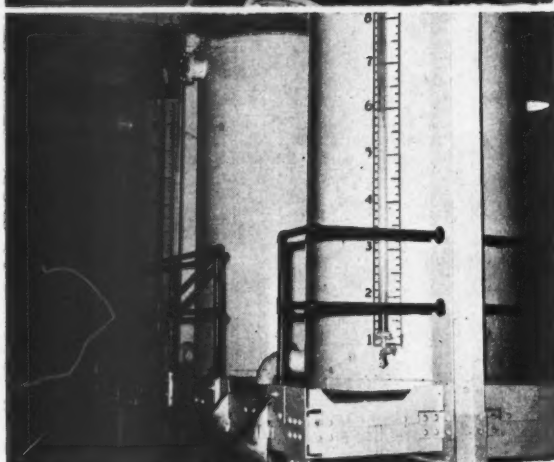
STAINLESS STEEL WELDING ROD saves many a piece of equipment. These two stainless steel pump shaft sleeves from digester circulating pumps have been built up with about 3 pounds of stainless welding rod where the sleeves were worn from contact with packing. Replacement of the worn sleeves with new ones would have taken 12 pounds of stainless steel. Arc welding with stainless steel was also employed to repair the stock pump sleeves shown.

BEARING HOUSINGS for reels are built up with bronze when worn. The wear occurs on the center and ends of the channel. It is built up with about 3 pounds of bronze using an acetylene torch. The reel on the left is still rough while the one on the right is finished and ready to go back in service on the paper machine reel.

BLOW VALVE DISC of stainless steel, 14 inches in diameter. Worn bearing surface repaired with 5 pounds of bronze applied with acetylene torch. Complete replacement would have taken about 100 pounds of metal.

WOOD FRAMING in place of metal supports this power assembly for a gear pump on a pasting machine.





installed face extensions on to the rolls providing a flat carrying surface for the entire felt width which has increased felt life.

"We practice building up the inner surface of chain links at the point where adjacent links engage and wear."

● Still another mill engineer reports on some interesting conservation kinks now used at his plant:

"We have recently built up the impellers on some of our fan pumps, and also on some of our stock pumps by the brazing process, in order to bring them up to full capacity.

"In order to save the purchasing of four new winder drums, we built them up to original size by the metal spray process, depositing low carbon steel on a cast iron background.

"Salvaging worn pump bodies by building up the worn places by the process of arc-welding, using a cast iron rod.

"Worn beater journals have been brought back to full size by turning them and then shrinking on cast steel sleeves.

"Instead of using tool steel for the knives on one of our trim cutters we have of late been using knives made of mild steel with the cutting edges hardened by the application of Stellite.

"Instead of renewing worn cast iron scorers we have applied Stellite to the wearing surface, and we have found this practice makes them even better than new ones.

"All parts that can be are built up by spray gun or arc-welding thereby avoiding the purchase of new parts."

● Stainless steel acid heater tubes are reclaimed by one mill in the following manner:

"We have worked out a technique here for reclaiming our stainless steel heater tubes from our acid heaters. Briefly, the reclaiming process is as follows: Old tubes are first inspected for defects. When defective sections are found the tubes are sawed, removing the defective sections. The balance of the tubes that are satisfactory for re-use are beveled slightly and machined true at the welding edges. The pieces of tube are then electrically welded with a stainless steel coated rod. After welding the reclaimed tube is tested at 250 lbs. hydrostatic pressure and if found tight the weld is machined so that the tube will pass through the tube sheet. The tube is then cut to proper length and after the inside of it has been cleaned it is ready for re-use.

"This process has greatly reduced our requirements for heater tubes, and the general use of it in the industry should effect a very material saving of stainless steel.

Dipping Tanks Prevent Electrical Breakdowns

● Several plants have installed tanks containing insulating varnish in which electrical apparatus are dipped. Eventually all, electrical insulation deteriorates in service, resulting in a brittle condition with numerous cracks which permit the entrance of moisture frequently laden with acid, alkalies, oils and other substances detrimental to insulating materials.

The method used in these plants is to clean the winding thoroughly; replace wedges and repair damaged insulation wherever necessary; place the piece of apparatus such as motor, generator or coil in a drying oven; raise the temperature to approximately 150° F.; then dip the entire piece of apparatus in the varnish which is maintained at room temperature. The difference in the temperatures will cause the varnish to flow into the coils, filling all voids and cracks. After the apparatus has been submerged for approximately one hour, it

SALVAGING PIPE and FITTINGS. Simplified piping layouts eliminated pipe and fittings. Good pieces will be cleaned and held for future use as will any that can be repaired. Non-usable material will be sold for scrap immediately.

CEMENT LININGS for corroded bleach liquor tanks save steel. These tanks will soon be repaired by lining with steel mesh and cement instead of being scrapped in favor of new steel tanks.

METAL SPRAYING saves many a part today. Here is a close-up of a pulp grinder shaft bearing surface built up with high carbon steel by spraying.

VARNISHED REDWOOD takes over these Bird screen head boxes from stainless steel or copper. Waterproof plywood is being used in place of metal lining for vats.

is lifted up allowing the excess varnish to drain into the tank, after which the apparatus is again placed in the baking oven until the varnish is thoroughly baked.

Afterwards, depending upon the kind of varnish used or the location of the apparatus with regard to moisture, alkalies, acids, oils, etc., it is sometimes desirable to spray the windings with another varnish or lacquer which has more resistance to these adverse conditions. Plants which have dipping tanks in operation have materially reduced electrical failures and saved many pounds of copper and electrical insulating materials that are now so vital to our national defense.

Ideas From Suppliers

Preventive Maintenance of Acid Proof Linings

● The care of acid proof linings in a pulp mill is more important today than ever before and should be given the attention it deserves. We all appreciate that with the mills operating twenty-four hours a day, seven days a week, and our government requesting more and more pulp, that it is very difficult at times to shut down equipment for proper inspection; yet this must be done if the mills are to obtain the maximum service from their equipment and not find themselves faced with extensive repairs to make and no materials with which to make them. An ounce of prevention will pay big dividends.

Sulphite digesters should be inspected at least every six months and in order to make a satisfactory inspection, it is necessary to take this digester out of production. At the time the inspection is made, all fittings should be repointed, especially the top and bottom sleeves and the large outlet fitting on the four circulating systems. The higher strength cooking acids now being employed in many of the mills has a very definite effect on the joint materials between bricks, especially in the bottom cone.

Particular attention should be paid to keeping the joint material between the brick in the first three or four courses near the bottom sleeve well pointed as there is a distinct tendency, with forced circulation, to erode the joints in this area. The expansion and contraction of the large outlet fitting on circulating systems, plus the vibration in the fitting, tends to break down the joint material around it. This fitting should be repointed at regular intervals.

A definite system of records covering the inspection of acid proof linings should be set up in each mill. It has now become common practice for the cook to report the condition of the lining after each blow by making a notation on the record of the blow. Should the cook discover anything unusual on the face of a lining, it should be immediately reported to the superintendent who can take the necessary steps to correct the condition. A small weep or a small leak can be pumped and serviced very readily—a serious leak may mean shell repairs as well as extensive lining repairs.

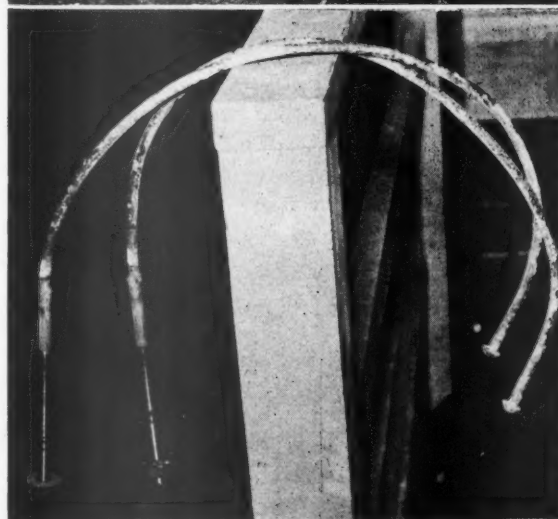
Acid accumulators should be inspected annually. This has not been done, but recent failures of dome linings in some vessels have influenced the operators to definitely plan on making annual inspections. Care should be taken at all times to see that all fittings on acid accumulators are checked and repointed every year.

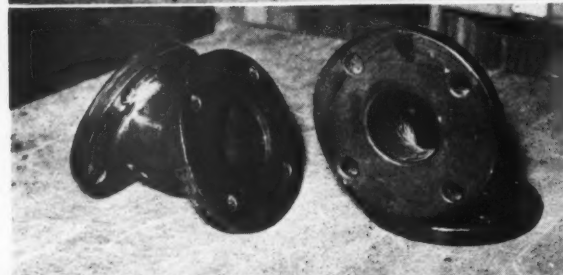
The majority of materials employed on acid proof linings in the pulp and paper industry are not, at the present time, governed by priorities. Litharge and glycerine used in these lin-

STOCK PUMP capacity increased. This bronze stock pump impeller was made to handle nearly double its original capacity by brazing on 3-inch tips of bronze from the gate of an old bronze gate valve.

WOOD PIPE BANDS are small but in the aggregate they constitute a large amount of metal in a pulp or paper mill. These have been repaired by welding threaded extensions of mild steel on to the ends of the old bands where the threads had been corroded. The pictured bands have 8-inch extensions of new 7/16-inch mild steel welded onto a 3/8-inch band for a 10-inch wood stave pipe. The mill estimated this method results in 80% recovery of the used bands.

STOCK LINE FITTING welded of scrap Everdur in the mill shop.





ings are on definite priority and must be conserved. It is therefore important that the mills' stocks of these two materials be kept for lining service work and that they not be used for patching around cooler ponds, in drains to main sewers, etc. Portland cement mortar, while not as satisfactory for these repairs over a period of time, will none the less prove perfectly satisfactory in this emergency.

It should be remembered that no other cements are available for lining service at the present time. Phenol resin cements, which require phenol and formaldehyde, are definitely classified as critical war materials and are unavailable. The old type silicate of soda cements are not obtainable either due to their content of sodium fluosilicate which is also on the high priority list. Stocks of litharge and glycerine must therefore be conserved.

By shutting down a sulphite digester semi-annually, and by shutting down an acid accumulator annually, corrective repairs can be made to the linings in this equipment and an extended service thereby obtained.—A. S. Quinn, vice president, Stebbins Engineering Corp., Seattle.

The Care of Rubber Rolls

● The care of rubber rolls is one of the most important maintenance problems faced by the pulp and paper industry as a result of the war. The extension of their useful life to the maximum is essential for we all know that our supply of rubber is limited and that the synthetics are not likely to be available to the industry for a long time.

With the permission of the Stowe & Woodward Company of Newton Upper Falls, Mass., and through the courtesy of George J. Guild of the Huntington Rubber Mills, Seattle, their Pacific Coast licensees, the following data on the care, handling and storage of rubber rolls is reproduced from Stowe & Woodward's records.

Handling and Storage

1. Store rolls in a cool, dark and damp room. Keep away from sunlight and do not expose to sudden or extreme changes in temperature.

2. Ideal temperature for roll storage is about 60 degrees F.

3. Store roll in shipping case if possible. Otherwise, first protect covering with strong wrapping paper, and then cover with old felts, burlap or pulp laps. Protect journals against rusting.

4. Always support roll on its journals, and give a quarter turn about every 2 months. Do not allow the roll to rest on the rubber cover, even for short periods of time. If this is unavoidable, place plenty of old felts, burlap or pulp laps under the roll.

5. We recommend handling rolls with a crane which has two hoists or lifts with a separate chain and sling for each journal.

If your crane has only one lift, we suggest a yoke with adjustable slings at each end. This in order to protect ends of covering from chafing or tearing.

Wood blocks against the ends of the roll will also prevent

GLASS COATING or vitreous enameling is being tried as a substitute for stainless steel, rubber lining and bronze. These wood pipe to flange fittings for carrying stock to a wet machine, 18 inches down to 8 inches, were fabricated in the mill shop of scrap 1/4-inch steel plate and sent to an enameling shop, where they were spray coated inside and out and baked at 1650 degrees F. Stainless steel fabricated sheets would ordinarily have been used for these fittings.

GLASS COATED cast iron fittings in the storeroom ready to be used if the present rubber lined fittings should be damaged. These have been coated inside and out but future jobs will be coated inside and on the flanges only. Ordinary gasket material is said to be sufficient to seal the flanged joint and prevent damage to the coating on the flanges.

CHIP SCREEN RAILS (mechanical shaker type) occasionally fractured from fatigue near lower ends. Breakage was stopped by fitting wood plank into the flanged rails to absorb vibration.

STREAMLINED FITTINGS salvaged. Streamlined copper tube fittings here shown have been salvaged from dismantled lines, solder removed and replaced in the spare parts room.

the chains from injuring the ends of the cover.

Another safe method is the use of a wide, strong belt as a sling. Be sure there is nothing on its surface to scratch the cover, and for safety provide padding as above mentioned.

6. If rolls are transported on small factory trucks, provide padding for protection so that rubber cover will not come in contact with wood or metal.

7. Store rolls away from traffic lanes to avoid damage by passing equipment, trucks or tools, etc. No grease or oil should come in contact with the rubber cover.

To Be Avoided

● Intelligent use and care of rubber rolls will increase their service life and the quality of their work. Some of the causes of reduced life and inefficient operation are:

1. Incorrect thickness, density or crown.
2. Grinding at too infrequent intervals.
3. Failure to grind off enough rubber to get below distressed surface. Particularly important when covering has checked.
4. Excessive pressure.
5. Uneven pressure across face of roll.
6. Imperfect surface or crown of engaging roll.
7. Imperfect alignment of top and bottom rolls.
8. Improperly designed body.
9. Faulty condition of driving equipment, gears, etc.
10. Not releasing pressure and lifting roll immediately machine is stopped.
11. Covering compound not adapted for service and operating conditions.
12. Excessive use of liquids and chemicals injurious to rubber, such as oils, foam killers, kerosene, solvents, etc.
13. Operating roll after cover has suffered a puncture or gouge. Moisture and pressure will enlarge and deepen the damage and eventually cause the cover to separate between the piles or from the core.
14. When a roll shows signs of corrugating, which is caused by excessive pressure, it should be ground immediately. If left in operation on the machine, the corrugations become deeper and when the roll is ground more rubber must be removed.

Crowns

● There have been countless papers and discussions on the subject of crowning rubber rolls, but we feel it is too important and there are too many variables to permit of general recommendations or of specification by theoretical calculations.

The crown for each roll should be determined by the operating condition of that roll, aided by the results obtained from previous crowning practice.

An important factor is the iron body. A strong, well-constructed body with a minimum of deflection simplifies the crowning problem. A great deal of trouble with crowns can, we believe, be traced to unsuitable bodies.

Rolls should operate with a minimum crown that will remove sufficient moisture and take it out uniformly across the sheet.

Some factors which determine crown are:

- Body construction
- Dimensions of roll
- Density and thickness of covering
- Position in the machine
- Grades being made
- Weighting practice

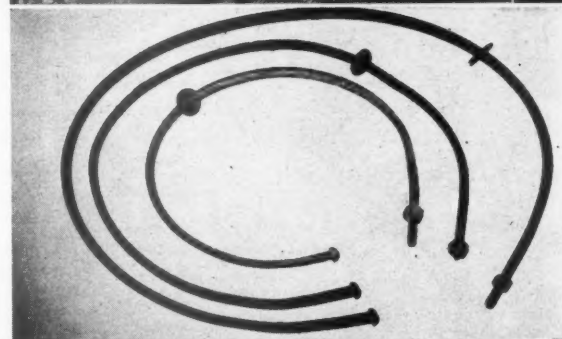
Some mills find it desirable to divide the crown between the top and bottom rolls.

Rolls in the Beloit Horizontal Dual Press require less crown.

STEEL WIRE, 6 gauge, already used once for swifters on log rafts is saved and used in arc-welding. This same wire is being used in the second picture.

WOOD PIPE BANDS reclaimed in another way. Instead of welding on new threaded ends to save old pipe bands, this mill cuts off the damaged threads and cuts new threads, shortening the bands for smaller pipe. When they become too short this plant resorts to the other method of welding on extensions.

GATE VALVE in white water line with fittings made of black iron pipe painted inside and out with **CHLORINATED RUBBER PAINT** to provide corrosion resistance. In some cases painted fittings are substituted for rubber lined or stainless steel fittings. To use chlorinated rubber paint successfully, the mill reports, it is necessary to sand blast both new and old metal surfaces just prior to applying the paint.



PACIFIC PULP & PAPER INDUSTRY



ing than rolls in the vertical presses.

Softer coverings require heavier crowns than hard coverings. Thicker coverings require heavier crowns than thin coverings. Wet areas in the center of the sheet indicate need for more crown, while wet edges usually indicate excessive or improper crown.

Density

● As in the case of crowns, generalizations are dangerous. Past experience, operating conditions and operating objectives are the best guides.

Softer rolls are easier on the felts and sheet, but extract less water and require more frequent grinding.

Harder rolls extract more moisture and enjoy longer life, but wear out the felts quicker and may crush the sheet if weighted too heavily.

The ideal density is that which will remove a satisfactory amount of water from the sheet without injury or detrimental action to the sheet or felt.

Consult your roll manufacturer for recommendations as to densities for your rolls, as it is not considered practical or safe to make general recommendations. We prefer to specify according to the particular operating conditions and the mill's practices.

Protection Against Corrosion

● Table, felt, wire and size press rolls should have the ends sealed or covered with rubber to prevent corrosion and separation between the covering and body.

Couch rolls, also, should have the ends sealed for this protection.

Press Roll Load Recorders

● This desirable equipment is designed to measure the pressure applied against each journal to insure uniform weighting across the face of the roll. Such a device should help greatly to lengthen the life of rubber rolls.

Grinding Rolls

● Reasonably frequent grinding of your rolls is an economy because less rubber has to be removed and the roll is always in best operating condition. When grinding, make certain to get below the disturbed surface of the cover.

Cam type roll grinders with cam or eccentric ring crowning mechanism produce, within a tolerance of .001 inch parabolic crowns which most closely follow the deflection arc of a press roll. Such a crown will allow more uniform moisture extraction and produce a sheet with more uniform caliper.

Surface conditions and crown of the engaging roll should be checked before grinding the rubber roll. Sometimes there are conditions here to be corrected.

Rolls should not be finished up with sandpaper, as this tends to destroy the accuracy of the crown applied by the grinder.

Practice varies, but we recommend that rolls be ground dry, and that a dust removal system be built on the grinder.

Do not grind the roll when removing from the machine to place in storage. It is all right to rough grind at this time, but finish grinding should be done just before installing. This will insure a fresh surface when the roll is started up.

For rolls that are to be stored for a relatively short period of time (not over 2 months) a finished grinding may be done before storage. This also applies to rolls that may be required at a moment's notice where time for even smoothing up on the grinder would not be available.

Do not attempt to hurry the grinding. A good job cannot

MAGNESIA PIPE COVERS from dismantled steam lines have been carefully removed and stored for future use.

LUBRICATION. To "Keep 'Em Rolling" and producing at today's high rate the **RIGHT AMOUNT of the RIGHT OIL or GREASE in the RIGHT PLACE at the RIGHT TIME**, is absolutely essential.

LOG HAUL DOGS or CHAIRS need repairing. Small sections of abrasion resistant steel have been inserted and welded to points of wear. When special abrasion resistant steel is not available mild steel is used.

CONVEYOR BELT IDLERS made in the mill shop from scrap pipe and roller bearings on hand.

CAST IRON PIPE FITTINGS repaired and stored for use when emergency arises.

be obtained unless sufficient time is taken.

Wheel should be kept well dressed, with slightly rounded corners. Dressing should be done while wheel is mounted in grinder, and preferably with a black diamond. If this is not available, we suggest diamond tips or Star wheel dresser.

Be sure to remove all traces of cracks or checking in the covering. If these are not ground out, the covering will check prematurely when placed in service.

If a very deep cut is necessary because of the condition of the covering, time will be saved by turning off with a tool in a lathe, and then finishing up in the grinder. This does not, of course, apply to ordinary maintenance grinding.

Things to watch:

Too soft a wheel which wears quickly and loses diameter.

Wheel drive belts being too tight or too loose.

Be sure carriage drive is well lubricated.

Do not delay grinding after inspection shows need of it. Frequent grinding will keep roll in best operating condition and will require less removal of rubber each time.

And finally—don't rush the job.

Rubber Hose and Belting Care

● "Exercise Is Good for Your Fire Hose," says the Pioneer Rubber Mills of San Francisco, represented in the Northwest by the Washington Belting & Rubber Co., Tacoma and Seattle.

"Fire hose, like an automobile tire, deteriorates faster when not in use, than if exercised occasionally. Here is an easy way to keep hose in good working condition, ready for any emergency:

"Every four months, unreel the hose, put it under nominal water pressure. This helps 'freshen' the rubber, keeps it from cracking. Dry the fabric thoroughly before re-reeling, and re-fold the hose in different places to insure longest possible life.

"Exercise your hose this week, then mark your calendar for another exercising four months from now." You'll be sure of having better fire hose if you follow through regularly on this plan."

Pioneer are offering suggestions on how to make mechanical rubber goods last longer in their advertisements in PACIFIC PULP & PAPER INDUSTRY. Another ad says:

"Keep Pulleys Clean" to lengthen belt life. A common cause of premature conveyor belt failure is dirt or other material accumulating on belt pulleys. As the dirt builds up, a crown is formed on the pulley which makes the belt run to one side. This results in excessive, uneven wear, and usually produces an abrasive action that steadily grinds away the cover.

"Inspection at the end of each shift," suggests Pioneer, "or at least once a week, depending on operating conditions, helps eliminate this costly hazard. Keep loading pits free from water and dirt; clean pulleys thoroughly, often. Belt life will be materially lengthened—a mighty important production factor today."

"One Full Load Is Cheaper Than Two Halves," says Pioneer in another ad. You can lengthen conveyor belt life in many cases by slowing belt speed, and still get the output to which your production is geared.

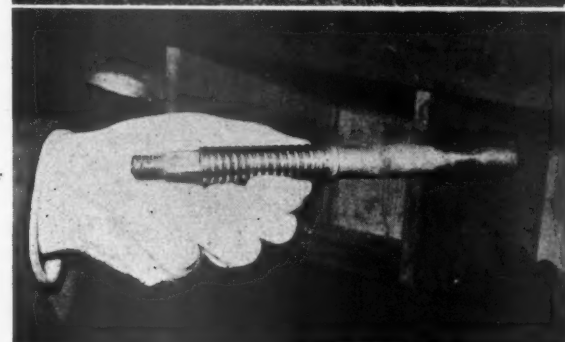
"A slow-running belt, fully loaded, will deliver as much ma-

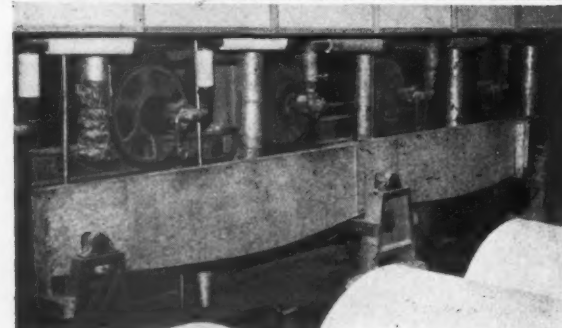
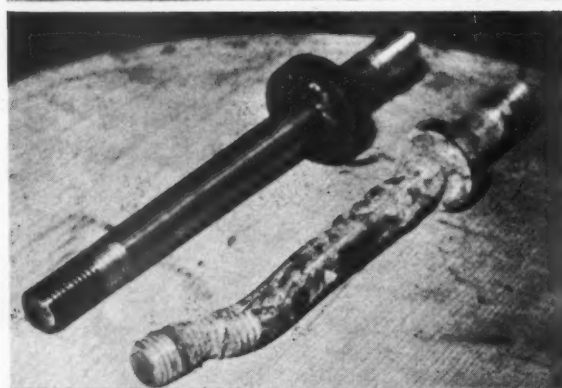
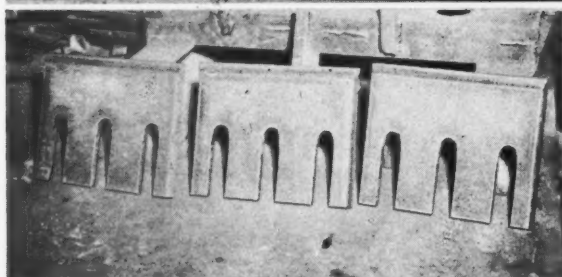
SDO COATING ON GAS FAN. DuPont Synthetic Drying Oil was applied to this plain steel main gas fan for the sulphur burner room. Life of from 9 months to a year is expected. Ordinarily stainless steel would be employed.

WOOD can frequently be substituted for steel. Here is an overhead bridge crane in a mill machine shop which was recently converted to a power drive. The frame supporting the motor and speed reducer is of wood which saved several hundred pounds of steel.

PATCHED STAINLESS PIPE. Cast stainless steel pipe in sulphite mill acid lines is reclaimed by welding short sections together. While the picture illustrates the idea, sections 10 feet long made up of 4 sections are to be found in Coast sulphate mills.

VALVE STEMS of stainless steel reclaimed by welding piece on end at right. Ordinary steel can be used for part not in contact with corrosives.





terial as one traveling twice as fast only half loaded. Fabric strain and abrasive action will be reduced—the belt will last longer.

"Treat your conveyor belt as you would your automobile tires. Pioneer belts are built to carry full loads, but a reduction in speed may add many valuable operating months to their useful life."

"Care and Maintenance of Conveyor and Elevator Belting," is the title of catalog section 2800 just recently issued by The B. F. Goodrich Company of Akron and Los Angeles. This 24-page bulletin contains much data on how to make conveyor belting last longer and is illustrated with photographs and drawings.

The Goodyear Tire & Rubber Company will shortly publish a booklet on how to conserve mechanical rubber goods and it will be available upon application. "The Goodyear Tire & Rubber Company," states W. T. Roberts, manager, Northwest district, mechanical goods sales, Salt Lake City, "through its technical organization scattered throughout the United States, considers its primary duty is to help users of mechanical rubber goods to conserve and to make those goods give more service than ever before. Mechanical rubber goods cannot be replaced as easily as formerly, and furthermore, on account of restrictions many specifications have of necessity been changed. In the interest of the war effort, it is necessary that mechanical goods users get the utmost out of the products which they have and which they may obtain. In the interest of that service, Goodyear's organization is anxious to cooperate with all users of rubber."

Screen Plates Must Be Conserved

● On the important subject of screen plates E. H. Hall, general manager of the Fitchburg Screen Plate Co., Inc., of Fitchburg, Mass., makes the following suggestions to the mills.

"The worst priority threat to screen plates today is curved plates for Bird screens and Jones screens. It is almost as difficult to obtain these today made of rolled copper as it is of rolled phosphor bronze, containing tin. Copper at the present moment is insufficient to fill war needs, and the allocations during April were not sufficient to even fill A-1-a priority requests for copper. This immediately gives an idea of what can be expected in the way of obtaining this metal for Bird screen plates or Jones screen plates.

"It therefore is going to be essential that the paper mills conserve their Bird or Jones screen plates possibly until the war is over.

"If you have any new Bird screen plates on hand it would probably be well to send them in and have them chromium plated, which would probably carry you through until the war is over. If your plates are already in use they should be watched very carefully and when they become somewhat worn they should be immediately removed and sent in to be recut. In no case, should they be let go until they are beyond repair, because unless you are very lucky you won't get any more Bird plates for a long time to come.

"The situation on flat screen plates at the moment is not quite as severe, as we are able to get the necessary bronze composition ingots to make these on an A-3 rating which screen plate concerns have secured all by themselves from the Government. Many orders with an A-10 rating from the pulp and paper mills are now being filled with metal purchased on A-3 rating secured by the screen plate makers.

"We have also spent a great deal of time and effort in Washington, convincing the tin and lead branch that we should be permitted to keep our mixture approximately at its present quality, and thus far have been successful. However,

KRAFT BLOW LINE FITTINGS and valves are continually repaired by lining with mild steel welding. Worn flanges are built up by welding, too.

HOG KNIVES made in the mill shop of mild steel and flame hardened. These are ready to be ground.

SHELL BOLTS of stainless steel are salvaged by sulphite mills. Corroded ends are cut off and a stub of KA2SMO is welded on and threaded.

STATIONARY DECKLE of wood replaces one of rubber on this fourdrinier.

PLYWOOD GUARDS on towel creping machine drive of ½-inch plywood using no metal except bolts and nails. Normally these guards would be made of ¼-inch steel plate.

we never know when some new ruling will come through to shut off our supply of metal and curtail our production of flat screen plates. At the moment there is plenty of this metal available as well as other supplies such as crucibles, coal, coke, grinding materials, milling cutters and saws to ensure continued manufacture of flat plates for some time to come.

"However, conservation of these plates is also the order of the day, and every care should be taken that flat plates are not abused and are treated with every possible care, to make them last as long as you possibly can.

"Plates should be removed before they are too badly worn, and sent in to be reclosed and recut. This will stretch the life of a plate indefinitely, depending upon how badly it is worn or abused when it is sent in for recutting. If plates are taken out of the screens and another size slot installed, the plates removed should be thoroughly washed and cleaned and dried before storing so as not to set up a dry corrosion with the chemicals and acids remaining in the stock caught in the slots. This is a very serious abuse of plates and could be easily corrected by a little care in washing the plates when they are taken out of the screens.

"Under no circumstances, should anybody be allowed to walk on screen plates. These plates are cut to almost watchlike precision, right to the very thousandth, and such care is useless if anybody is going to walk on them with heavy shoes and deliberately bend and distort the slots. Plates in the screens should be washed with a steam hose or a water pressure hose, and under no circumstances should shovels be used to clean the screen. This, of course, injures the slot edges and bends the slot bar and soon puts the plates out of commission.

"When plates do become worn and are replaced with new plates, the mill would be going a long way toward preserving their future supply, to make sure that these plates are not sold out on the open market. They are a special alloy developed for screen plates, of much higher quality than the general run of scrap bronze which you sell to your junk dealer, and the day may come when you will be glad to be able to swap the discarded plates for new ones, much as you are now doing with your tooth paste tubes.

"While the thought farthest away is to alarm anybody about this situation, nevertheless a thorough knowledge of what we are up against in this war will work to conserve our supply of screen plates and stretch them out to their fullest extent of service, and we here are pledged to do all we possibly can to help make the available supply of screen plates last so that no mill will be without a necessary supply for their screening."

Bird Screen Plates

● The Bird Machine Company of South Walpole, Mass., in a recent issue of "The Stuff Box" suggested that they be used by the paper mills "As the Clearing House for Bird Screen Plate Procurement and Disposal." Their suggestion follows:

"We hardly need to tell you that the hard-rolled phosphor bronze or hard-rolled copper of which Bird Screen plates are made is scarcer than hen's teeth. Without a priority rating of A-1-J or better the metal for new plates isn't going to be available.

"From the standpoint of conservation of critically needed metal as well as maximum assistance to Bird Screen users we'd like to suggest that you use us here at South Walpole as a clearing house of information both as to your needs and your supply of worn or discarded plates that may be available. We have a pretty good idea that there are a lot of "Stuff Box" readers who are in possession of plates that, new or worn, are not at present in use, because of changes in screen operation due to change in grades or some such reason.

"If you have some screen plates that aren't working—no matter what their condition—it would be not only patriotic but definitely helpful to your industry if you would tell us about them. We'll see that the information is passed along to every point of inquiry that any mill might get in touch with. If, as and when you need plates this information on what and where they may be obtained will be readily obtainable from a central source, so providing this information on whatever plates you may have that are not in use may work to your direct advantage sooner or later, too.

"Here is the information we'd like to have in order to be of the most and quickest help to everyone concerned.

Number of plates available.

Whether plates are for No. 2 or No. 3 Bird Screens.

What they're made of—copper or bronze.

Whether chrome plated or not.

Thickness— $\frac{1}{8}$ -in. or $\frac{3}{16}$ -in.

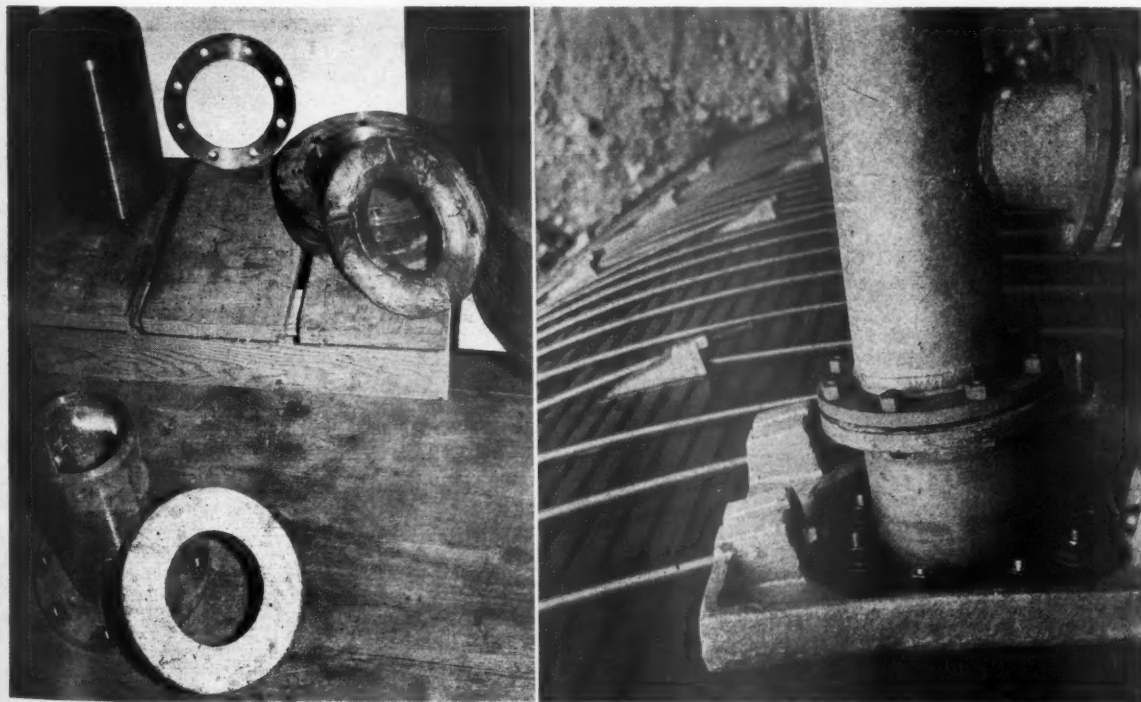
Cut, or width of slots, when new (the original cut is stamped on each plate).

Width of slot, now, if worn.

Spacing of slots.

How attached to screen cylinder—by flat bed screws or clamping bar.

"Once we accumulate this information on what is available and also on what is needed, we'll be in a position to do a good turn all around—by helping those who may need the plates badly and at the same time assisting those who have some plates



SCRAP LEAD was melted and cast into these acid tank fittings at the mill. In this case the lead substituted for approximately 1 ton of stainless steel.

on their hands they'd be glad to dispose of, for the good of the conservation program and of their fellow papermakers.

"We look forward to hearing from you on this subject and you can count on us to handle our part of this worth while screen plate conservation program in a way that will be of maximum benefit to the industry."

● Bird screen shower pipes are hard to obtain, advises Frank F. Frothingham, western manager of the Bird Machine Co., Chicago. He suggests that the mills consider rebuilding them although it has seldom been done in the past because of the cost. "When you get down to the point where you can't obtain the pipe," says Mr. Frothingham, "then even if a rebuilt one does cost as much as a new one, you can get the same efficiency with a rebuilt shower pipe as you could with a new one. And your screens keep running."

Electrical Maintenance

● The Westinghouse Electric & Mfg. Co. of East Pittsburgh, Pa., has issued a Maintenance Check Chart which is available from any of the district offices. The chart contains the following suggestions for maintaining electrical equipment in good operating condition:

Motors

Keep the Windings, Ventilating Ducts, Commutators and Brush Rigging Clean. In dusty locations, blow out weekly; under severe conditions, daily. Do not use air pressure higher than 50 lbs.

Lubricate Regularly, Carefully. Follow manufacturer's instructions. Oil daily those motors that require it. Schedule definite oiling dates for the others. In dusty or damp locations, drain oil once a month and renew. Do not over-lubricate. It wastes oil, gets in windings and deteriorates insulation.

Examine Bearings. Check daily on heavily used motors; once a week on others. Check oil ring. Feel for high temperatures. Check for excessive end play.

Check Air Gap Between the Rotor and the Stator. Check weekly on motors that operate with excessive belt tension; others, once a month. Differences in width of gap indicate bearing wear which, once started, accelerates rapidly.

Inspect Brushes and Commutators. Check daily on those motors in severe service; others once a week. Keep commutators smooth, with brushes seated perfectly. On carbon brushes use correct grade to prevent excessive commutator wear and control arcing.

Inspect All Exposed Motor Leads. Check weekly. Keep connections tight, free from oil and moisture, well insulated and protected.



PACIFIC PULP & PAPER INDUSTRY

Inspect Ground Connections. Check weekly. Keep tight and in good condition. **THESE ARE IMPORTANT TO SAFETY** of employees and, in some cases, of current protective devices.

Control Equipment

Includes Magnetic Switches, Air and Oil Circuit Breakers, Controllers, Compensators, etc.

Keep Control Equipment Clean. Once a week, clean and blow out dirt and dust from starting switches, compensators and air circuit breakers. Under unusually clean conditions, clean out quarterly or semi-annually. Keep dirt and dust off high voltage bushings and terminals.

Keep Contacts Smooth. Inspect heavily used equipment weekly; others once a month. File burned contacts smooth or replace. **DO NOT LUBRICATE CONTACT SURFACES.**

Replace Worn Parts. Under severe conditions examine all equipment monthly and replace all worn or burned parts; under normal conditions, semi-annually. Keep adjustments correct.

Keep Electrical and Mechanical Connections Tight. Once a week inspect parts that vibrate. Look for loose connections, missing or loose nuts, and broken mechanical parts.

Keep Oil at Proper Level and in Good Condition. Under severe conditions or in dirty or damp locations, make a monthly check of oil condition and oil level. Replace dirty or gummy oil. Keep level up to indicator.

Check Overload Devices. Circuit breaker tripping points should be checked monthly. Replace dashpot oil if thick and gummy. Keep orifices in plunger clear. Keep leather bellows soft and pliable with neat's-foot oil. Be sure that heater coils for thermal overload relays are the correct size. Check overload relay settings every six months.

Lightning Arresters

Maintain Ground Connections. Inspect in early spring before the start of the lightning season. Check the condition and resistance of ground connections. Resistance should not be over 5 ohms. A buried water main provides good ground. **NEVER RUN GROUND WIRE THROUGH IRON OR STEEL PIPE UNLESS WIRE AND PIPE ARE BOUND TOGETHER.**

Wiring

Keep Wiring in Safe Condition. Examine monthly where vibration exists. Keep lock nuts and bushings tight on conduit, cables and other raceways. Protect wire from oil and water. Keep open wiring tight, insulated and safe from mechanical injury. Inspect all wiring once a year.

Check Extensions and Drop Cords. Examine every three months where use is heavy. Check closely where wire enters socket, plug, switch, etc. Replace or repair excess wear promptly. Keep drop cords away from nails, metal hooks, etc. Keep lamp guards in place.

Keep Switch, Junction, Fuse and Panel Boxes Clean and Tightly Covered. In dusty locations clean out weekly. Keep covers and unused "knockout" plugs in place. Inspect monthly.

Fuses

Check Size. Twice a year inspect all fuses to determine that circuits are not over fused.

Keep Fuse Clips Clean and Tight. Check connections to prevent overheating and breakdown.

Maintain Refillable Type Fuses. Replace charred casings. Keep fuse assembly tight. Refill with links at the same rating as the casing.

Keep Fuse and Switch Cabinets Tight. Prevent escaping sparks when fuses blow by plugging unused knockouts. Always keep doors tightly closed and secured.

Transformers

Keep Oil in Good Condition. Test annually to determine dielectric strength. If less than 18 kilovolts in standard tester, recondition oil.

Maintain Oil at Proper Level. Check oil level every three months. Replace leakage and evaporation loss promptly.

Prevent Excessive Temperatures. Test operating temperature of fully loaded transformer once a month. Temperature should never exceed 90° C.

● The General Electric Company is aiding industrial plants to make their electrical equipment serve more efficiently and last longer through field work covering such points as outlined

CINDER EROSION wears away induced draft fans. Welding keeps them going and avoids using new steel.

by C. W. Fick, General Electric engineer in charge of the East Central district, before the Cincinnati Electrical Maintenance Engineers Association. Mr. Fick said in part:

The electrical maintenance engineer's job may be divided into three main parts:

1. To prevent interruptions or outages which may be caused by accidents to or failures of the electrical service or electrical equipment in the plant.
2. To keep the duration of those interruptions which do occur to a minimum.
3. To plan for increased loads and extensions of electrical service.

The first step in preventing interruptions is to keep an up-to-date list of all electrical equipment in the plant. This should account for every motor, control box, transformer, circuit breaker, as well as electric cables, in terms of size and rated capacity. Next, a regular schedule of inspection must be set up so that the load carried by the electrical apparatus, as well as the condition of the apparatus, is known. If nothing is done until failures actually occur, they will begin popping all around. Production managers are calling for increased output on each machine. If the maintenance engineer knows what that means in the load on his electrical apparatus, he can work closely with the production manager or with the foreman to see that production is not stepped up to a point where a failure of the electrical apparatus will surely occur.

It should not be necessary for motors to squeal for lack of oil, or smoke from overload, before their condition is checked to see what can be done about it. The oil in transformers and oil circuit breakers is expected to serve as an insulating, cooling, or arc-quenching medium. However, oil can deteriorate gradually with the result that these characteristics are impaired. Breakdown of equipment has more than once been due to the fact that the dielectric strength of the oil was not what it should have been, or that the oil level was not maintained. Such accidents are really a reflection upon the care and attention given by the maintenance man. Not always, but sometimes. In those cases the accident could have been prevented by the regular inspection schedule.

Transformer supervisors occasionally find an ancient or heavily overloaded transformer in which the oil has congealed to a jelly-like mass. Obviously, in that condition the oil cannot do the job expected of it, either as an insulating or cooling medium.

Motor bearings fail because of lack of oil, and with the heavier and higher speed machines, the results of bearing failures can extend beyond merely bearing replacements. Sufficient heat may be generated to spring the shaft, or the rotor may rub on the stator damaging the laminations with a consequent expensive repair job. In these times it is more than ever necessary to prevent bearing failures because of the scarcity of bearing materials. Copper, tin, and antimony, which go into the makeup of the babbitt, are now on the critical list.

Improper brush pressure can result in flashovers of commutators, or arcing at collector rings. It is such an easy matter to keep the brush pressure at recommended values that there is really no excuse for troubles of that sort.

In many plants the wire and cable are being called upon to carry excessive loads. The cables themselves may not show distress, but they may have been figured for a certain voltage drop at normal currents, and when those currents are greatly exceeded the voltage delivered to the motor or to the apparatus may not be sufficient to permit that machine to do its job properly. A 10 per cent voltage drop results in a 19 per cent loss of torque in an induction motor. That actually means a decrease in the production of the machine driven by that motor, and today we are looking for increased, not decreased, production.

Keeping Outages To a Minimum

● The wise maintenance engineer plans on some failures occurring even though he takes every precaution to prevent them. Experience and a careful check on loadings will generally indicate possible danger points. The best procedure is to (1) have spare parts available; (2) if possible have a spare machine ready to install in place of the one that fails; and (3) know where each type of apparatus can be repaired most reliably and quickly, so that in case of failure, no time will be lost in locating a suitable repair shop. This is good information to have on the card record of each machine.

Planning for Extensions of Service

● Where a new machine is to be added it is often possible to simply extend an existing cable run without overloading the cable or causing excessive voltage drop. This should be done intelligently, of course, knowing both the capacity of the cable and the load it will be called upon to carry.

Major plant extensions, on the other hand, will require entirely new feeders, and in such cases it is suggested that specialists be consulted. Incorrect methods of supplying power to new plants and to plant extensions cost excessively and waste materials. Studies have been made which prove that the load-center distribution method of supplying power offers many advantages. In this method a factory-built unit substation is installed at the load center and fed by high-voltage cable, in contrast with the older method of bringing the high-voltage cable to an outdoor substation and then having long runs of low-voltage cable. The unit substation method permits the use of smaller transformers, which in turn permit the use of smaller rupturing capacity breakers, and it keeps the length of runs of heavy, low-voltage cable to a minimum. Time is saved in the installation of such a distribution system, and frequently the cost is reduced by 20 per cent.

● To sum up, the maintenance engineer's job is, first, to know at all times the condition of his apparatus; second, to know the loads the apparatus must carry; and third, correct the weak points before they fail. Doing a good maintenance job can contribute directly to the war effort.

Nash Pump Maintenance

Suggestions to make Nash vacuum pumps last are advanced by Carlo Vicario, manager of the pulp and paper division, Nash Engineering Co., South Norwalk, Conn., and represented in the Northwest by the James Brinkley Co., Seattle, and E. A. Finkbeiner, Lewis Building, Portland.

"We would caution the mills to always use the best grade and proper type of packing to prevent wear on shafts where they pass through stuffing boxes," says Mr. Vicario. "We would suggest extra care in maintaining ball bearings, checking them at frequent intervals, changing the lubricant to prevent failure which would allow the rotating parts to come out of alignment and wear."

"Great advances have been made recently in the metallizing process of spraying on molten metals to worn surfaces. This procedure will make many parts last longer than they have in the past."

"The problem of corrosion is not encountered to a great extent with Nash pumps since normally they are applied where the white water is neutral. However, in such cases where it is on the acid side steps should be taken in the process where possible to neutralize the acid."

Lead Still Available—An Excellent Substitute

● According to a statement by the Northwest Lead Company of Seattle restrictions on the use of lead do not affect their ability to supply the pulp and paper industry when lead is required in the handling of corrosive materials.

Although lead is one of the essential "war metals," its continued use in handling corrosives has been approved by the War Production Board. Under present conditions, a high priority rating is not essential to secure lead pipe, sheet lead and other lead products and production facilities at the Seattle manufacturing plant of Northwest Lead Company are ample to fill all requirements of the industry, as well as the large tonnage of direct war-effort business now being produced for the Government.

The use of lead, in its improved alloys, has been found highly satisfactory in recent years, in many places where physical limitations formerly made it impracticable as a construction material. This is particularly true of the Bunker Hill tellurium lead alloy, which has been used with much success and has shown an unusual ability to withstand high temperatures and corrosive conditions formerly considered prohibitive.

With many other corrosion-resistant metals now obtainable only through high priority rating, or not obtainable at all, the use of lead warrants every consideration as a highly satisfactory and inexpensive replacement material.

Various alloys of lead have been developed to meet severe service problems and the versatility of lead and its ease of installation even in special types of equipment, make it additionally attractive. The use of lead for lining both open and closed tanks and the lining of ferrous and other piping, has shown good results in many instances where lead lacks structural strength but is desired because of its corrosion-resistant properties.

Northwest Lead Company has supplied the acid and chemical plants of the Western States for the past 25 years with many types of lead. The benefit of this diversified field experience, and the laboratory facilities maintained at the Seattle plant, are available to the mills needing corrosion resistant replacement material under present-day conditions.

The Importance of Fillets In Preventing Shaft and Journal Fracture

● Under normal service the metal parts of modern machinery, especially line shafts, shafts and journals such as used in a modern pulp and paper plant seldom break or fail due to shearing, crushing, stretching or fracturing from loading. The parts are usually designed with a sufficient factor of safety to prevent such failures, and if they do occur, the parts are re-designed or a stronger metal is substituted.

Failures do occur, however, much too frequently, often resulting in costly shutdowns. These failures are caused by metal "fatigue" which manifests itself after the load has repeatedly stressed the metal. These "fatigue" failures occur even though the metal is worked well under its elastic limit. The broken parts show some spot or injury, usually on the surface, from which cracks started progressing gradually during many thousands of cycles of operation until the part has nearly cracked through. The rupture suddenly occurs when the cross section of the part has been reduced to a point where it will no longer sustain the load.

These fractures, when closely examined, will inevitably show evidence of the reason for their occurrence. The crack will invariably start from some surface defect, a nick, a scratch, a flaw, a sharp change of section, a tool mark, etc. The most frequent cause of metal fatigue with particular regard to shafts and journals is sharp changes of section or contour.

The figures illustrate the stress concentration around various fillets. Fig. 1 shows a relatively large stress concentration set up around a small fillet while Fig. 2 shows a lower stress concentration set up around a larger fillet. Fig. 3 shows a re-entrant fillet which has a higher stress concentration than a small fillet but not nearly so high as a square shoulder would produce. Fillets of this type can be used to good advantage, instead of square shoulder, where space will not permit a fillet having a longer radius. Fig. 4 shows a poorly machined fillet on which a sharp shoulder was left, vastly increasing the stress concentrations. Fillets of this kind should not be allowed.

Experience has proven that wherever a properly designed and machined fillet has been allowed in any piece of material, stresses will be distributed over a large area and fatigue will be prevented. The cost of machine work is almost universally based upon the weight of material removed. Therefore, by allowing a fillet, the cost of machine work will be reduced.—L. C. Baltzelle, supervising engineer, Pacific Indemnity Co., Seattle.

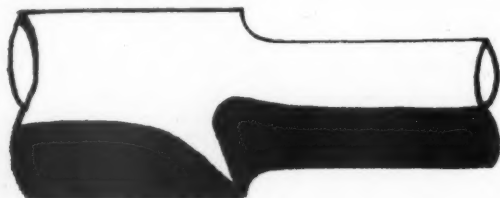


FIG. 1

MAX. STRESS CURVE

$$\frac{1.6}{1}$$



FIG. 2

MAX. STRESS CURVE

$$\frac{1.1}{1}$$



FIG. 3

MAX. STRESS CURVE

$$\frac{1.8}{1}$$

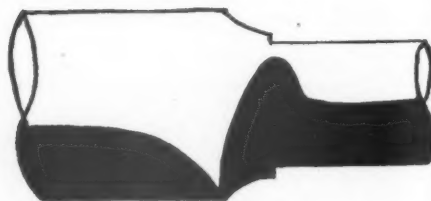


FIG. 4

MAX. STRESS CURVE

$$\frac{2.5}{1}$$

Piping and Valve Care

● "Treat Piping Right—It Pays," says the Crane Company in No. 1 of a series of bulletins on the selection and maintenance of piping, valves and fittings. Quoting:

"Pipe Dope Is Good—But Not Inside a Line. Pipe dope should be used on the male end of a joint only to keep it out of lines. It's likely to damage valve seats when it gets inside piping.

"Look Out for Dirt in Valves. It's wise always to inspect valves and fittings for dirt, before putting them in a line—especially used materials. When dirt gets into valve seats it can cut them and cause leakage, or, it may even stop the operation of other equipment.

"How to Make Up a Valve and Nipple. It's not good practice to put the valve in the vise when you're making up a joint. There's danger of giving it too much squeeze which can distort and damage the working parts or even crush the valve.

"A Blow-Out Before Using May Prevent a Break-Down Later. It's so easy for dirt and sand to get into pipe stored out in the yard. That's why it's best to blow or swab out pipe before using. Pipe scale and dirt are often the cause of leaky valves.

"How to Support Piping. Spacing of hangers or supports at about 10-foot intervals is considered good practice for most installations. When heavy equipment is used, added supports may be necessary. It's always best to place supports close to valves.

"Thread Lubricant Makes It Easier to Pull Up Joints Tight. It reduces friction between threads—assures smooth, close metal-to-metal contact without damage to threads. Joints come apart easier when lubricant is used—it protects threads from rust and corrosion.

"Never Use a 'Hickey.'—to make up a joint. Too much leverage will twist a valve out of shape and stretch or crack a fitting. Experienced pipe fitters say the only safe place to use a 'hickey' is on a stubborn joint when taking down a line.

"Misalignments at Valves Causes Trouble. You'll have no trouble putting in a valve when pipe flanges are lined up properly and the piping is well supported. There's trouble ahead in making up a joint that's out of alignment. A severe stress on the valve flanges may distort the valve seats and prevent tight closure.

"Support the Line on Both Sides of a Valve. Serious harm can come to valves when the line is supported on but one side of the valve. They aren't built to hold up the weight of a line while hangers are being installed. Always have the pipe properly supported before putting in valves.

"Every Pipe Line Needs Support. Piping won't stand up and work efficiently without adequate supports. Its own weight and the force of flow may pull it loose at the joints and cripple the valves in the line.

"Put Your Wrench on the Pipe End When Pulling Up a Valve. Severe stress on the unsupported end may twist a valve and harm its working parts if you apply wrench pressure on the outside end.

"Good Piping Begins With the Right Size Wrench. Play safe—pick the right size wrench to pull up a joint. With too much leverage you may unknowingly twist a valve out of shape, or even crack a fitting. On hex end valves, a monkey wrench always does a better job.

"Reaming of Pipe Protects Valve Seats. After threading pipe, reaming of ends is necessary to clean out burrs. When not removed, burrs get into valves and other equipment and damage seating surfaces. Burrs can also cause serious obstruction to flow.

"Use Crossover Method to Tighten Flange Bolts. Uniform pull on bolts reduced stress on valve flanges and other parts of valves. The crossover method, tightening opposite bolts, gives uniform tightening."

Caring for Scales

● Scales are important to all pulp and paper mills but are usually taken for granted unless they quit functioning altogether. They need maintenance along with other valuable equipment. The Toledo Scale Company suggests the following points for scale maintenance under the headings of "A Little Care Will Double the Wear."

"1. Scales should not be overloaded. Overloading shortens scale life, and leads to inaccuracies. This should be watched particularly where a scale is exchanged between various departments in a plant.

"2. A load should never be dropped on a scale. The locking mechanism of the scale should be used when a load is placed on a scale, or trucks rolled over the platform.

"3. Scales should be kept clean. Periodic cleaning of lever systems and exposed parts of the scale prevent undue accumulation of foreign material which affects weighing accuracy. Pit type scales, especially those installed out doors, should be inspected at frequent intervals to see that all dirt and material falling into the scale pit are cleaned out. Where water drains are installed in scale pits, clean away any rubbish which might prevent the water from being carried off.

"4. Some scales are equipped with dashpots, which reduce the indicator oscillation and absorb shock caused by loading the scale. These should be checked periodically to see that the fluid used is at a proper level and that the valve is adjusted for efficient operation.

"5. Beam and single pendulum type scales should be kept level for most accurate weighing.

"6. Some dial scales are equipped with oil sealed connection between lever system and dial to prevent moisture or dust from entering indicating mechanism at that point. Level of oil should be checked several times a year for proper protection.

"7. Scales installed in excessive corrosive conditions should be checked more frequently than other scales. A special grease, of sufficiently light viscosity to permit free operation of the various parts, may be applied to the pivots and bearings for protection. Do not use heavy grease or oil, which will cause a bind or drag in the weighing mechanism.

"Paper and pulp mills will find that a set of test weights, ranging in size to accommodate the unit graduation of smallest scales to 50-pound weight to test heavy duty scales, are a good investment. All scale equipment in a plant should be tested at regular intervals to establish weighing accuracy, and to correct any trouble immediately as it is detected. If the plant has no scale department, someone should be placed in charge of checking and testing all weighing equipment in the plant. For those plants who wish it, scale manufacturers offer facilities of nation-wide service departments, which are capable of servicing and testing all kinds of scales.

"Testing bench dial scales which are widely used both in the process operation and the shipping of paper products, the inspector should see to it that the scale indicator is at a zero position at the start of a test. Test weights are placed on the platform and readings made to the full capacity of the scale. A simple test record can be made by listing the correct weight of the test weights in one column and the weight as indicated by the scale in another column. Any errors will show up as a variation from the actual test weight, and can be corrected immediately.

"For testing the larger platform or built-in scales, the test weights, usually 50-pound uniform castings, are placed on the center of the scale platform in 50 or 100-pound steps to full capacity, and readings made of the scale beam or dial to determine accuracy. Similar tests are made at each of the four corners of the platform with weights equal to 25% of the total capacity of the scale.

"On the dial type of scale, the indicator should show the exact value of the test weights used. The zero reading of the scale should be checked when the scale is empty, for correct balance. On the beam type of scale, the empty scale should be balanced so that the scale beam is balanced exactly in the middle of the beam loop stop. The poise weights on the beam are set at specified points and test weights should be placed on the scale. The beam should balance exactly in the center of the loop stop, and any errors will be indicated by out-of-center position of the beam in the loop, and should be corrected.

"Continuous weighing scales, such as used to control uniformity of the paper web, should be checked frequently by the scale manufacturer, or some competent service man. Beater scales, basis weight scales and other specialized weighing equipment should also be inspected and serviced by the scale manufacturer, unless proper equipment is at the disposal of the plant for maintenance program."

Care of Calender Rolls

● Suggestions for the care of the chilled iron rolls employed in calender stacks is offered by the Lobdell Car Wheel Company of Wilmington, Delaware.

"Although the faces of chilled rolls are unusually hard and durable they can be easily injured by carelessness or neglect. The reconditioning of rolls so injured is a slow and expensive

THE LOSS OF AIR, STEAM OR WATER IS COSTLY

Area of Leak Diameter Inches.	Air		Steam		Water	
	Number of cubic feet per month at 75 lbs. pres.	Total cost of waste per month	Pounds wasted per month at 150 lbs. pres.	Total cost of waste per month	Gallons wasted per month at 40 lbs. pres.	Total cost of waste per month
1/2"	13,468,000	\$53.87	1,197,737	\$203.62	1,234,521	\$18.53
3/8"	7,558,500	30.23	673,868	114.56	692,842	10.40
1/4"	3,366,990	13.47	299,428	50.90	308,626	4.64
1/8"	824,570	3.30	75,012	12.75	75,581	1.14
1/16"	213,000	.85	18,896	3.21	19,529	.30
1/32"	52,910	.21	4,873	.83	4,852	.08

The above figures serve only to emphasize the cost of leaks and do not claim to be representative of any plant or plants. Steam and water costs vary regionally and from plant to plant. Domestic water pressure and costs are given here.

process and the observance of certain common sense rules in their use, handling and storing will be found to pay attractive dividends.

"Close attention should be paid to the doctors, if used, to prevent injury from them, for although the roll face is much harder than the doctor blade, through maladjustment, foreign matter under the contact, or hard, glazed spots on the blades, they may cause cuts or scratches in the roll face that will spoil the paper and require many hours of regrinding to remove.

"Plugging of the rolls by wads of paper if not corrected promptly will not only cut the roll face but also if allowed to continue long enough will heat up the roll face sufficiently to cause it to crack or craze which may eventually cause the surface to 'shell out' leaving a defect that will require many days of grinding to remove if it does not permanently impair the roll for further use.

"Running the rolls without paper between them for any length of time is decidedly bad practice and will result in roughness of the surface and undue wear. If the complete stack is not needed the rolls not in use should be hung up or removed.

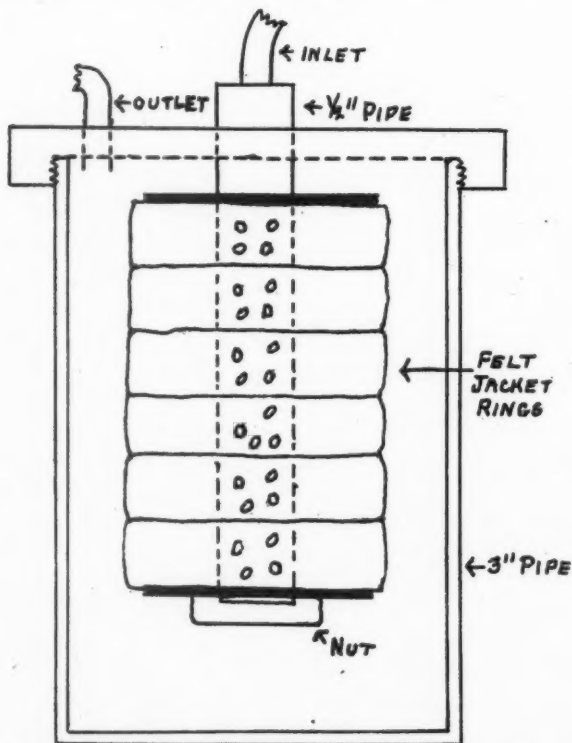
"If some of the rolls are to be hung up and not used for some time they should be cleaned off with kerosene and thoroughly covered with slushing oil or anti-rust compound to prevent rusting from dampness. Also if the complete stack is to be shut down for some time the same should be done with all of the rolls. If this precaution is not taken there will usually result a streak of rust pits at each contact which will require much longer to remove at the next regrinding if they do not make necessary immediate regrinding before they can be again put in use.

"Sand or grit in the stock or water used on water finish will also cause rapid and excessive roughening and wear.

"Finished rolls should never be rolled or slid across the floor on their faces. Always transfer finished rolls on skids or in their boxes.

"If rolls are to be stored they should be thoroughly cleaned with kerosene and coated with a liberal application of a good anti-rust compound, wrapped in cheese cloth or muslin soaked in oil and supported in their boxes or skids on the journals, never on the faces.

"The observance of these rules and ordinary care in the prevention of misuse and neglect will be found to greatly reduce the cost and time of reconditioning.



Construction sketch of the shop made oil filter shown in the photograph on Page 11, using scrap pipe and pieces of a felt jacket.

Safely Stretching Steaming Capacity

● With steam plants running at capacity or beyond maintenance has become a problem demanding more careful attention than under normal conditions. A recently issued booklet, "How to Safely Stretch Steaming Capacity," by the Bailey Meter Company of Cleveland, Ohio, is of special interest to power engineers, maintenance men and executives.

Numerous fundamental suggestions are made under the general headings of 1. Check condition of boiler and furnace. 2. Check operating procedure. 3. Check possibilities for Modernization. 4. Base daily operations on accurate measurements and records.

Many of the suggestions made can be carried out without the use of elaborate metering or control equipment. This bulletin, which is actually a check list of procedure for boiler room improvement, also explains how the proper use of metering and control equipment stretches steaming capacity, avoids frequent shut-downs for maintenance, insures safety of men and equipment, furnishes data for comparison of fuels, reduces fuel consumption, and maintains efficiency while new operating crews are being trained.

Ball Bearing Races Can Be Reclaimed

● Reclamation of ball bearings is not a new process but has in recent months become of greater importance to the pulp and paper industry because of the difficulty of obtaining new bearings. The General Tool Company of Portland has reclaimed ball bearings for 15 years and states that bearings not too badly worn can be reclaimed to 100 per cent of new performance by regrinding.

The process involves regrinding the races of the bearings to former curvatures and inserting new oversize balls to compensate for the material removed. The reconditioned bearings are carefully inspected, oiled and packed in cases.

Miscellaneous Mill Ideas

● A master mechanic was strong for good lighting. "The best lighting is just as important in our machine shop as anywhere else in the mill or office," he commented. "Since we installed fluorescent lighting in our shop the men have made fewer mistakes and thereby saved material. They turn out more work, too, and are happier with their jobs. They aren't as tired at the end of the shift as they used to be. Conserving manpower is every bit as important as conserving material."

"If a mill can't get fluorescent lights at present it should buy the best available, but make sure there is plenty of light over the machines. With the mill machine shops headed for a 100-hour week schedule on war work lighting is far more important than ever before."

Conveyor chains in the sawmill can be salvaged once by drilling out the holes and putting in larger rivets.

Sulphur burner bearings of iron wear down in time and can be repaired by bronze or cast iron welding.

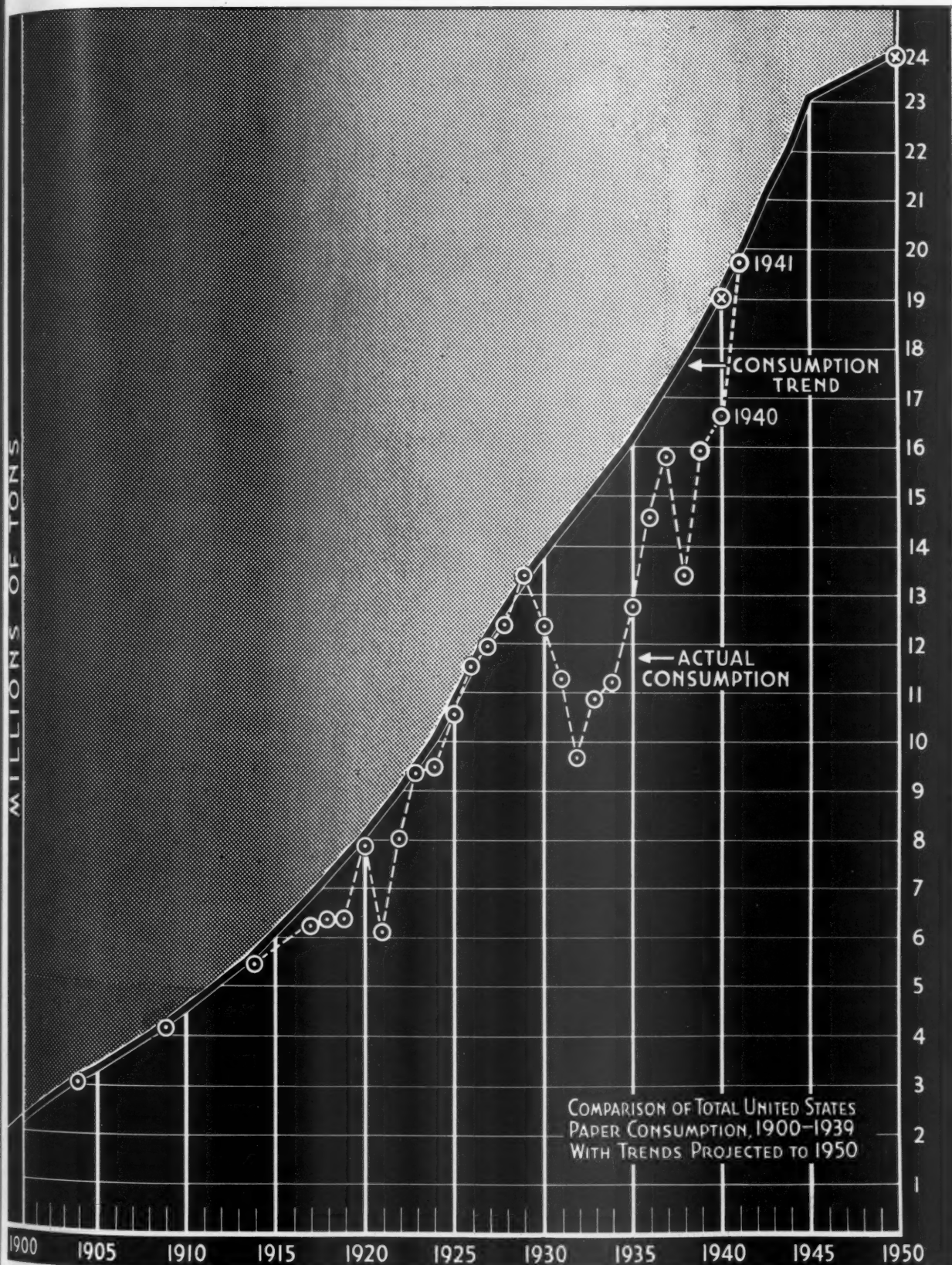
Maintenance on major switchgear can be minimized by enclosing it in airtight rooms with forced ventilation under pressure slightly higher than that outside the room. This keeps out moisture and dirt. If a fan is available this idea is worth applying in the spot where switchgear is subjected to the worst conditions.

The repair of cast iron parts is easily accomplished by the use of Tobin bronze but requires a skilled operator.

● Editor's Note—The foregoing ideas for substituting, for salvaging and for making equipment and materials last longer through proper maintenance, are offered as a cross-section only of the sincere, intensive efforts being put forth by the mills and the producers of their equipment, supplies and services to "Make More With Less." Limitations were, space in this issue and the number of ideas available at the moment of going to press.

More ideas will be presented in future issues. If you have thoughts that will aid in conserving, salvaging and substituting, help the common effort by sending them in.

Most of the suggestions offered by the makers of equipment and supplies are already being carried out by the pulp and paper industry. However, their inclusion will enable mill operators to make certain that no opportunities are being overlooked in their programs to save the maximum amount of scarce materials for direct war use, and, at the same time, produce as large a volume of the industry's products as may be needed in the attainment of Victory.



TREND OF PAPER CONSUMPTION is toward a United States paper consumption of 24,000,000 tons in 1950. This graph is drawn to an arithmetical vertical scale from a ratio scale graph prepared in April, 1938, by Charles W. Boyce, then Secretary of the American Paper & Pulp Association. War stimulated consumption brought the 1941 figure up to Mr. Boyce's trend curve.

Building An Air Raid Siren From Scrap Materials

How to make "The World's Victory Steam Siren" designed by Carl E. Braun, Vice President & Mill Manager, Hawley Pulp & Paper Company, and built of materials salvaged from the mill scrap pile at Oregon City, Oregon.

THE steam air raid siren built of scrap materials by the men of the Hawley Pulp & Paper Company's organization at Oregon City, Oregon, and dedicated on February 28th to serve the citizens of the community, has proved of interest to other plants throughout the country. To facilitate the construction of the siren by other mills, Mr. Carl E. Braun, vice president and mill manager, has supplied the following "How To Make It" description.

From Mr. Braun's design the mill mechanics listed the necessary materials and then went to the scrap pile. It was felt that despite the public service to be rendered by the siren, new materials ought not be used in its construction. As a result of the search practically every piece used in making the siren was salvaged from the scrap heap.

Before beginning the construction of this self-propelling steam siren study the accompanying draw-

ing and figure the materials that can be picked up from your own scrap pile.

While the drawing is largely self-explanatory the builder is cautioned about three most important points.

1. Be sure that the openings in the rotor and stator, marked "E," are milled out at the proper angle.

2. The non-stalling openings, marked "F," should be drilled at the proper angle and placed exactly as shown in the drawing, section BB. It will be noted that these holes are placed progressively so that one hole and parts of the adjacent openings are always in position for the admission of steam which will immediately start to propel the rotor, thereby putting the large openings directly in the path of the incoming steam for the higher speed or carry-over.

3. See that the rotor brakes are of proper size to give the sound suitable for the particular location. All sirens will not resonate the same in different localities. A higher pitched sound may be required. In this case the brakes used can be shortened, causing the rotor to speed up a little more. If a lower tone is preferred, the rotor can be slowed down by increasing the length of the brake shoe. Increasing length coupled with extra weight will tend to slow the rotor and vice versa.

A suitable brake shoe for average localities is shown on the drawing. The builder must also take into consideration the fact that different tones can be produced by varying the steam pressure around the outside chamber of the stator "A." While this siren was originally built for steam operation, we understand it can also be driven by air. However, it will require a considerable volume of air and will not be economical.

It will be noted from the full size scale general assembly drawing that the mechanics used a standard black pipe nipple with standard flanges.

While the drawing calls for making the rotor "E," the stator "F"

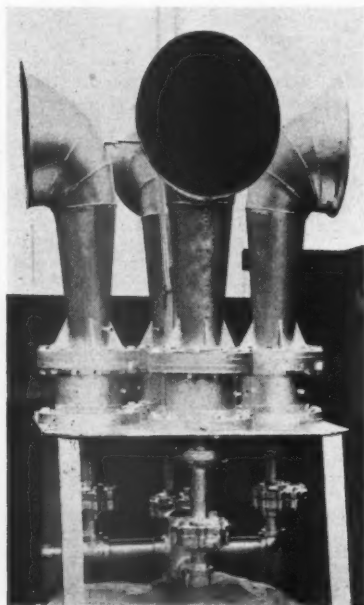
and the casting "C" of brass, this is unnecessary. Pieces of pipe and cast iron will work just as satisfactorily, provided all the dimensions are followed closely. Be sure there is enough clearance between the rotor "E" and the stator "F" so that any chance of rust stalling the rotor is eliminated. The larger the clearance between rotor and stator the greater will be the steam leakage. It is our belief that if the dimensions given for the rotor and stator are followed very closely, the clearances will be satisfactory when either or both are made of pipe or steel tubing and "C" is of cast iron.

Ball bearings are shown at the top and bottom of the rotor shaft. Standard sleeve bearings, properly lubricated will be equally satisfactory. However, in using sleeve bearings, remember that there is somewhat of a drag and this will help the braking action. Sleeve bearings must be thoroughly lubricated after a blow so as to avoid possibility of "freezing." The bottom bearing must stand a thrust.

The horn details are about average and it is unnecessary to follow these exactly. Small scraps of plate can be employed and by welding them carefully the proper curvature can be obtained.

The details in the drawing for the stator seat are complete. Be sure and drill a 3/16-inch hole as shown on the plan just to the left of the center. This hole drains off any condensate that is liable to collect in the bottom of the rotor chamber.

The controlling valves for the Hawley siren are discarded model W extra lasting blow off valves which had served their purpose on the boilers and were not tight enough to put back into service. Valves of this type are quick opening and naturally good for signaling purposes when used with this steam siren. A 2 1/2-inch valve is used for each siren when there is 150-pounds steam on the high pressure side of the valve. When steam is admitted to the siren there is a drop in pressure in the line. We believe that



CLOSE UP of the Hawley Pulp & Paper Company's four steam air raid sirens made in the mill shop.

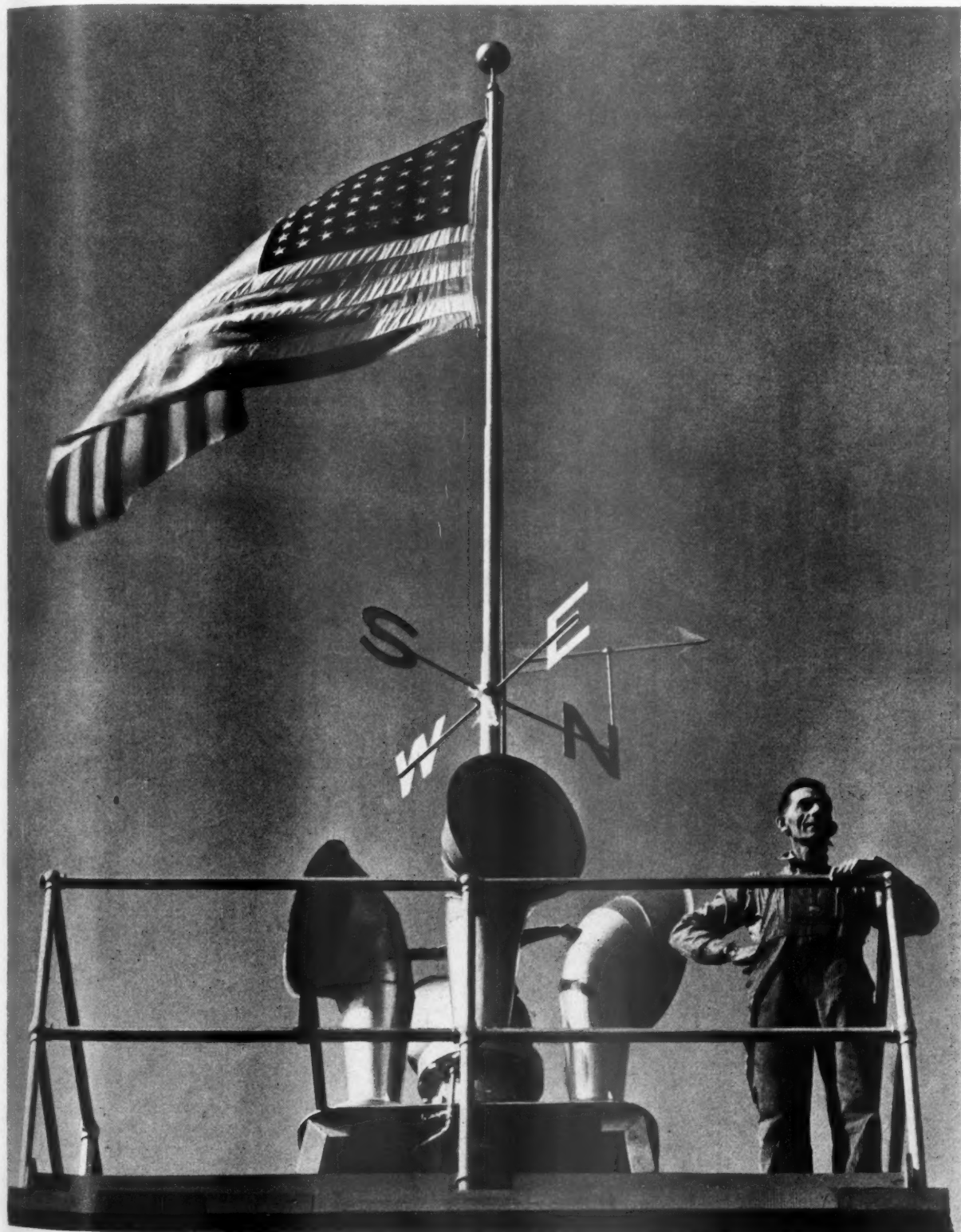
between 40 and 60 pounds is preferable for maximum sounding around the outside of the stator "F."

The lower the steam pressure on the main line to the siren, the larger the signaling valve required, and the

reverse is true in that the higher the steam pressure the smaller the valve needed.

At the Hawley mill four sirens were built, one for each direction, North, South, East and West. All

steam valves are locked together and the four sirens blow simultaneously. (See Pacific Pulp & Paper Industry, March, 1942, for story on the dedication of the siren to the citizens of Oregon City).



PULP AND PAPER CAPACITIES OF PACIFIC COAST MILLS Showing principal grades manufactured and capacities in tons per 24-hour day

Name of Mill	Location	—PULP—					—PAPER—					REMARKS		
		Mechanical	Unbleached Sulphite	Bleached Sulphite	Unbleached Sulphate	Bleached Sulphate	Soda	News	Sulphites	Sulphates	Book		Board	Others
BRITISH COLUMBIA														
British Columbia Pulp & Paper Co.	Woodfibre			230										{ Bleached sulphite of rayon and paper grades. { News, Kraft and Sulphite Wrapping, fruit wrap, tissues, etc. { Newsprint, unbleached sulphite pulp and groundwood pulp. { Roofing and boards. Kraft and sulphite wrapping; second sheets; fruit wraps; tissues; specialties.
British Columbia Pulp & Paper Co.	Port Alice			180										
Pacific Mills, Ltd.	Ocean Falls	230	90		135			240	47	105		30	25	
Powell River Co., Ltd.	Powell River	656	155					720						
Sidney Roofing & Paper Co.	Victoria	10												
Sorg Pulp Co., Ltd.	Port Mellon				120									
Westminster Paper Co., Ltd.	New Westminster									40				
WASHINGTON														
Anacortes Pulp Co.	Anacortes		85										12	{ Rag roofing, etc. { Unbleached and bleached sulphite and groundwood papers; wrapping; newsprint; fruit wraps; tissues. { Sulphite, sulphate and groundwood specialties, tissue, M. F. book, etc. { Book, railroad, writing, school supplies, (10 tons de-inked pulp) { Products same as Everett mill (idle). { Box and container board, pulp board. { White patent coated board, bottle cap bd. { Box and container board, coated board. { Sulphite bonds, writing, specialties. { News, wrapping, poster, sulphite specialties, etc. { Board, wrapping, bags, container, boxes. { Kraft liner board, wrapping, bag paper. Toilet Tissues, Towels, etc. { All kinds of boards. Rayon and paper grades. Rayon and paper grades. { All Rayon grade, includes 140 tons produced by Tacoma Division. { Entire output bleached and dried at Shelton. Not included in unbleached total. Bleaching capacity 250 tons daily. Newsprint.
Berkheimer Mfg. Co., J. E.	Tacoma	30	140	110				150						
Columbia River Paper Mills	Vancouver	90	350	150	195	†		245	190					
Crown Willamette Paper Co. (Division of Crown Zellerbach Corp.)	Camas						60			70				
Everett Pulp & Paper Co.	Everett									(25)				
Everett Pulp & Paper Co.	West Tacoma													
Fibreboard Products Inc.	Port Angeles	25	65								65			
Fibreboard Products Inc.	Sumner											75		
Grays Harbor Pulp & Paper Co.	Hoquiam	90	33					68						
Inland Empire Paper Co.	Millwood	100									230			
Longview Fibre Co.	Longview				350	†				210	120			
National Paper Products Co. (Division of Crown Zellerbach Corp.)	Port Townsend				285					165				
Pacific Coast Paper Mills of Wash., Inc.	Bellingham											60		
Pacific Paperboard Co.	Longview	30												
Puget Sound Pulp & Timber Co.	Bellingham		480											
Rayonier Inc., Grays Harbor Division	Hoquiam			300										
Rayonier Inc., Port Angeles Division	Port Angeles			260										
Rayonier Inc., Shelton Division	Shelton			350						22				
Rayonier Inc., Tacoma Division	Tacoma		140											
St. Regis Paper Co. (Kraft Pulp Division)	Tacoma				325	(250)								
Soundview Pulp Co.	Everett			500										
Washington Pulp & Paper Corporation (Division of Crown Zellerbach Corp.)	Port Angeles	310	60											
Weyerhaeuser Timber Co. (Pulp Division)	Everett		260											
Weyerhaeuser Timber Co. (Pulp Division)	Longview			250										

Personnel Directory of Pacific Coast Pulp, Paper, Paperboard and Roofing Mills

ANACORTES PULP CO.

(Wholly owned subsidiary of the Scott Paper Co.) Chester, Pa.

Anacortes, Wash.

William S. Campbell, Pres.
John McKirdy, Jr. Vice-pres.
Gen.-Mgr.
Raymond C. Mateer, Vice-pres.
Cassius E. Gates, Secy.
Jesse R. Lewis, Plant Supt.
Allan Strang, Chief Chemist.
Herman L. Hansen, Asst., Office Mgr.

Capacity. Pulp: 85 tons Unbleached Sulphite.

BERKHEIMER MANUFACTURING CO., J. E.

2925 South M. Street.

Tacoma, Wash.

J. E. Berkheimer, Owner, Pres.
C. F. Humble, Supt.
H. A. Montgomery, Mgr.
Branch Office, Kenton Station, Portland, Ore.

Capacity. 12 tons Rag Roofing, etc.

BRITISH COLUMBIA PULP & PAPER CO., LTD.

General Offices: Bank of Nova Scotia Bldg., Vancouver, B. C.

Mills: Fort Alice and Woodfibre, B. C.

Officers:
Lawrence Killam, Pres. & Manag. Dir.
George Kidd, Vice-Pres.
Ethel M. Dominy, Secy.
G. D. Humphrey, Sales.
A. E. Baker, Purch. Agt.
L. K. Bickel, Chief Chemist.

Fort Alice Mill:

Peter McGhee, Plant Comptroller.
R. H. Richmond, Supt.
C. C. Ryan, Chief Eng.
C. Davidson, Master Mech.
John G. Morrison, Chem.
O. E. Shaw, Steam Eng.
Walter Warner, Log. Supt.
Capacity. Pulp: 180 tons Bleached Sulphite.

Woodfibre Mill:

E. P. Brennan, Plant Mgr.
Leo C. Kelley, Pulp Mill Supt.
W. A. Bain, Chief Eng.
William Arnold, Power Plant Eng.
W. L. McGregor, Master Mech.
V. M. Warren, Traffic Mgr.
Capacity. Pulp: 230 tons Bleached Sulphite.

CALIFORNIA-OREGON PAPER MILLS

(Division of Columbia River Paper Mills.)

Los Angeles, Calif.

F. W. Leadbetter, Pres.
Theodore Osmund, Vice-pres.
Treas. Pur. Agt.
A. M. Cronin, Secy.
Nils G. Teren, Vice-pres., Mgr.
Taylor Alexander, Div. Mgr., Asst. Secy.
Vincent P. Cole, Supt.
Capacity. Paper: 40 tons Sulphites, 40 tons Sulphates.

CERTAIN-TEED PRODUCTS CORP.

Headquarters 100 E 42nd St., New York City.

Mill: Richmond, Calif.

Henry J. Hartley, Pres.
H. J. Dowd, Vice-Pres., Compt.
A. O. Graves, Secy.
A. J. Mohan, Pur. Agt.
(All above at New York).
J. F. Meyer, Res. Mgr.
Capacity. 45 tons Roofing, Felts, Mulching and Building Papers.

COLUMBIA RIVER PAPER MILLS

Headquarters Office: 615 S. W. Alder St., Portland, Ore.

Mill Office: Vancouver, Wash.

F. W. Leadbetter, Pres.
Nils G. Teren, Vice-Pres., Gen. Mgr.
Theodore Osmund, Vice-Pres.
E. J. Carey, Res. Mgr.
Ambrose M. Cronin, Jr., Secy.
W. P. Donnelly, Asst. Secy.
Thomas Grant, Sulphite Supt.
Merrill E. Norwood, Paper Mill Supt.
W. H. Neal, Chief Engineer.
Thomas Parks, Plant Engineer.
L. E. Orthmann, Saw Mill Supt.
Capacity. Pulp: 30 tons Mechanical, 140 tons Unbleached Sulphite, 110 tons Bleached Sulphite. Paper: 150 tons Sulphites.

COOS BAY PULP CORP.

Headquarters Office: Scott Paper Co., Chester, Pa.

Mill Office: Empire, Oregon

William S. Campbell, Chairman Board, Pres.
C. Wylie Smith, Vice-Pres., Gen. Mgr., Purch. Agt.
R. C. Mateer, Vice-Pres.
F. C. McCulloch, Secy.
W. R. Scott, Treas.
J. D. Fraser, Plant Supt.
M. B. Pineo, Chief Chem.
G. E. McKimmings, Master Mech.
Julian Du Frane, Chief Elect.
G. F. Blessing, Asst., Office Mgr.
Capacity. Pulp: 75 tons Unbleached Sulphite.

CROWN ZELLERBACH CORPORATION

General Offices: 343 Sansome St., San Francisco, Calif.

Pulp and Paper Mills: Camas, Texas; Oakland and Los Angeles, Calif.; North Portland, Wash.; Lebanon and West Linn, Oregon; Carthage, N. Y.; Ocean Falls, B. C.

Converting Plants: Harlingen, Texas; Oakland and Los Angeles, Calif.; North Portland, Oregon, and Vancouver, B. C.

Officers:
Louis Bloch, Chairman of the Board.
J. D. Zellerbach, Pres.
A. E. Martin, Exec. Vice-Pres.
R. A. McDonald, Exec. Vice-Pres., (Sales).
H. L. Zellerbach, Exec. Vice-Pres. (Zellerbach Paper Co.).
Thos. McLaren, Vice-Pres. & Treas.
Albert Bankus, Vice Pres. (Mfg.).
J. Y. Baruh, Vice-Pres.
D. S. Denman, Vice-Pres., (Tob. & Log. Dept.) Seattle.
A. B. Lowenstein, Vice-Pres.
F. N. Youngman, Vice-Pres. (Portland).
D. J. Galen, Secy.
A. L. Bennett, Comptroller.
A. R. Heron, Dir. Indus. & Public Relations.
Oakley W. Dexter, Purch. Agt. (On leave with WPB).
Carl F. Gaiser, Purch. Agt. (Portland).
John Sullivan, Purch. Agt. (Seattle).
W. R. Barber, Tech. Dir.

DIVISIONS

Crown Willamette Paper Co., Division of Crown Zellerbach Corp.

Camas, Wash.

J. E. Hanny, Res. Mgr.
G. W. Charters, Asst. Res. Mgr.
A. G. Natwick, Asst. Res. Mgr.
A. W. Olson, Asst. to Res. Mgr.

Frank F. Sullivan, Asst. to Res. Mgr.

G. M. Julien, Asst. to Res. Mgr.

J. J. Lobb, Asst. to Res. Mgr.

R. O. Hunt, Office Mgr.

H. D. Kennedy, Purch. Agt.

H. M. Green, Order Dept.

V. C. Gault, Personnel Supvr.

Mrs. Vera Berney, Asst. to Personnel Supvr.

J. F. Robertson, Safety Supvr.

W. R. Barber, Tech. Dir., Central Lab.

Fred A. Olmsted, Tech. Supvr.

Gus Ostenson, Paper Mill Supt.

E. Webberley, Beater Room Supt.

Paul V. Millard, Finish. Room Supt.

J. V. Savage, Sulphite Mill Supt.

L. D. McGlothlin, Sulphate Supt.

F. R. Stevers, Groundwood Foreman.

J. L. Shively, Bag Factory Supt.

H. W. Duvall, Converting Plant Foreman.

J. G. Giger, Napkin Dept. Foreman.

Herman Junge, Woodmill Supt.

O. T. Defleux, Supt. Steam Plant.

Fred Stevey, Chief Elect.

Lyall Burnett, Eng. Dept. Supvr.

I. C. Shotwell, Mech. Supt.

L. W. Morgan, Foreman Pipe Fitters.

Gordon Atkins, Foreman Paper Machine Millwrights.

Claude Smith, Yard Foreman.

Clifford Arnold, Shipping Foreman.

Howard Burrell, Real Estate.

Capacity. Pulp: 90 tons Mechanical, 350 tons Unbleached Sulphite, 150 tons Bleached Sulphite, 195 tons Unbleached Sulphate. Paper: 245 tons Sulphites, 190 tons Sulphates.

Washington Pulp & Paper Corp., Division of Crown Zellerbach Corp.

Port Angeles, Wash.

R. A. Dupuis, Res. Mgr.

H. L. Day, Office Mgr.

Merle Cashman, Personnel & Safety Supvr.

L. L. Dupuis, Gen. Supt.

J. W. Edwards, Asst. Supt.

O. S. Cauvel, Sulphite Supt.

M. L. Rauch, Groundwood Supt.

T. B. Hargreaves, Maint. Eng.

G. R. Davison, Woodmill Supt.

J. Somers, Finish. Room Foreman.

W. L. Kidd, Yard Foreman.

L. E. Warwick, Asst. Maint. Eng.

Harry Larsen, Elec. Foreman.

W. Locke, Steam Eng.

Capacity. Pulp: 310 tons Mechanical, 60 tons Unbleached Sulphite. Paper: 355 tons Newsprint.

National Paper Products Co., Division of Crown Zellerbach Corp.

Port Townsend Wash.

E. W. Erickson, Res. Mgr.

L. Ziel, Asst. Mgr.

G. B. Thomas, Finishing & Shipping Foreman.

Urban Grandaw, Bag Fact. Foreman.

C. Bunge, Tech. Supvr.

Capacity. Pulp: 285 tons Unbleached Sulphate. Paper: 165 tons Sulphates, 120 tons Board.

Crown Willamette Paper Co., Division of Crown Zellerbach Corp.

Lebanon, Ore.

P. F. Middlebrook, Res. Mgr.

H. C. Olds, Office Mgr.

C. E. Ackley, Supt.

Hugh Croner, Personnel & Safety Supvr.

E. C. Leckbank, Master Mech.

Louren LaFond, Sulphite Supt.

J. O. Morris, Steam Plant Eng.

R. D. Waddell, Tech. Supvr.

R. W. Weeks, Finish. Room Foreman.

L. L. Loftin, Purch. Agt.

Capacity. Pulp: 50 tons Unbleached Sulphite. Paper: 50 tons Sulphites.

Crown Willamette Paper Co., Division of Crown Zellerbach Corp.

West Linn, Ore.

C. E. Bruner, Res. Mgr.

M. J. Otis, Asst. Res. Mgr.

Hugh E. Burdon, Office Mgr.

M. A. Willson, Mill Supply Supvr.

H. A. Zirlb, Order & Shipping Supvr.

J. A. Ream, Personnel & Safety Supvr.

C. A. Enghouse, Tech. Supvr.

R. K. Pratt, Plant Eng.

R. A. Austin, Woodmill Foreman.

C. A. Baxter, Groundwood Mill Foreman.

Jan Haugerod, Sulphite Mill Foreman.

J. A. Harris, Paper Mill Supt.

F. A. Hammerle, Finish. Foreman.

E. T. Walker, Chief Steam Eng.

W. S. Boutwell, Chief Elect.

J. B. Rauch, Yard Foreman.

F. D. Simmons, Master Mech.

Capacity. Pulp: 440 tons Mechanical, 115 tons Unbleached Sulphite. Paper: 223 tons Newsprint, 35 tons Sulphites, 99 tons other.

Pacific Mills, Ltd., Canadian Subsidiary of Crown Zellerbach Corp.

Executive Offices: Vancouver, B. C.

Mills: Ocean Falls, B. C., and Vancouver, B. C.

Officers:

Louis Bloch, Chairman of Board.

A. B. Martin, Pres.

J. D. Zellerbach, Vice-Pres.

F. N. Youngman, Vice-Pres.

Albert Bankus, Vice-Pres.

J. A. Young, Vice-Pres. & Treas.

J. H. Lawson, Secy.

R. H. R. Young, Res. Mgr.

J. Petrie, Asst. Res. Mgr.

Kenneth Logan, Tech. Supvr.

G. J. Bryant, Master Mech.

EL REY PRODUCTS CO.

Alhambra Ave. & San Pablo St.
Los Angeles, Calif.

Robert E. Brown, Pres.
Joseph Brown, Jr., Vice-Pres.,
Gen. Mgr.
Harold D. Brown, Secy.
Capacity: 33 tons Roofing, Car
Lining, Industrial Flooring.

EVERETT PULP & PAPER CO.

P. O. Box 1006,
Everett, Wash.

MMH: Everett, Wash.
A. H. B. Jordan, Pres., Treas.
W. J. Pilz, Vice-Pres., Sec.,
Mgr., Asst. Treas.
A. B. Moody, Asst. Mgr.
L. P. Fortier, Gen. Supt.
K. A. Knudson, Purch. Agt.,
Traffic Mgr.
C. B. Niel, Supt. Maint. &
Power.
G. H. Hart, Chief Elect.
John Shedd, Chief Chem.
J. J. Murphy, Convert. Plant
Supt.
Vern Moore, Finish. Room
Supt.
J. C. Hayes, Forester.
G. A. Blomberg, Office Mgr.
C. L. Pitcher, Master Mech.
Fred Buckley, Asst. Chief
Eng.
H. Radford Russell, Asst. Pa-
per Mill Supt.
E. H. Ahues, Safety Eng.
R. A. Gates, Mgr., Main Mill
Sales, San Francisco.
John E. Horton, Mgr., Stat'y
& Tablet Dept. Sales, San
Francisco.
A. A. Ernst, Mgr., Sales Of-
fice, Los Angeles.
H. E. Stewart, Sales Office,
Everett.
Jerry LeCuyer, Sales Office,
Everett.
Capacity: Pulp: 60 tons Soda.
Paper: 70 tons Book.

EVERETT PULP & PAPER CO.

(Formerly Cascade Paper Co.)

West Tacoma, Wash.
Mill Idle.
A. H. B. Jordan, Pres. &
Treas.
W. J. Pilz, Vice-Pres., Secy.,
& Mgr.
A. B. Moody, Asst. Secy.
L. P. Fortier, Gen. Supt.
A. N. Drips, Mill Mgr.
Capacity: Paper: 35 tons Book.

FERNSTROM PAPER MILLS, INC.

1450 West Holt Ave.
Femosa, Calif.

Erik Fernstrom, Chairman of
Board.
F. O. Fernstrom, Pres.
J. E. Maurer, Vice-Pres., &
Treas.
D. P. Nichols, Secy.
C. G. Frampton, Supt.
E. G. Swanberg, Prod. Mgr.
J. W. Genuit, Vice-Pres.,
Sales Mgr.
R. S. Buckley, Chief Chem.
Robert A. Baum, Asst. Chem.
Mrs. Agnes Felts, Asst. Sales
Mgr.
F. W. Scrimmes, Asst. Secy.,
Credit Mgr.
H. Vought, Traffic Mgr.,
Purch. Agt.
William Zietz, Plant Eng.
S. B. Stevenson, Finish. Room
Foreman.
F. D. Backer, Printing Fore-
man.
Capacity: Paper: 60 tons Sul-
phites.

**FIBREBOARD PRO-
DUCTS, INC.**

General Offices: 710 Russ Bldg.
San Francisco, Calif.

Mills: Pulp and Board, Port
Angeles, Wash.; Board Mills
and Converting Plants, Anti-
och, Los Angeles (Vernon),
and Stockton, Calif.; Sumner,
Wash.; Binder Board Mill, Los
Angeles, Calif.; Converting
Plants, San Francisco and
Southgate, Calif., and Port-
land, Ore.

Officers:

J. D. Zellerbach, Chairman of
the Board.
D. H. Patterson, Jr., Pres. &
Gen. Mgr.
T. Noel Bland, Vice-Pres. &
Asst. Gen. Mgr.
N. M. Brisobols, Vice-Pres. in
Chg. of Operations (Stock-
ton)
E. J. Farina, Vice Pres. in
Chg. of Sales.
V. C. Hobbs, Secy.
J. F. Garvin, Treas.
H. L. Weber, Purch. Agt.

DIVISIONS**PORT ANGELES DIVISION**

1313 Marine Drive,
Port Angeles, Wash.
R. E. Bundy, Res. Mgr.
C. V. Basom, Board Mill Supt.
T. H. Beaune, Sulphite Mill
Supt.
J. W. Bonnar, Chief Eng.
Nelson Hartnagel, Chief Chem.
R. O. Holcomb, Asst. Chem.
Fred Miller, Chief Elect.
E. J. Cavanaugh, Eng.
J. H. Clay & C. F. Meagher,
Machine Foremen.
George Adams, Finish. Room
Supt., Ship. Supt.
R. A. Lawrence, Personnel
Mgr.
A. F. Benson, Master Mech.
P. C. Nash, Office Mgr.
G. M. Marvin, Purch. Agt.
Capacity: Pulp: 25 tons Me-
chanical, 65 tons Unbleached
Sulphite. Paper: 65 tons
Board.

SUMNER DIVISION

Sumner, Wash.
M. E. Sanford, Res. Mgr.
W. Talkington, Prod. Mgr.
H. O. Meyers, Bd. Mill Supt.
V. M. Buchanan, Night Bd.
Mill Supt.
J. H. Dunn, Convert. Plant
Supt.
R. W. Vaughan, Chief Chem.,
Safety Supvr.
R. J. Boyle, Chief Elect.
A. J. Erickson, Office Mgr.
L. O. Fox, Asst.
J. J. Sperb, Plant Eng., Mas-
ter Mech.
V. M. Gerhard, Personnel
Mgr., Paymaster.
F. W. Hilliard, Purch. Agt.
J. T. Stahliut, Shpgg. Supt.
Capacity: Paper: 75 tons Board.

PORTLAND DIVISION

50 N. E. Oregon St.
Portland, Ore.
J. B. Martin, Jr., Resident
Mgr.
S. G. Pettitt, Supt.
T. L. Elchenberger, Office
Mgr.
M. E. Meyers, Plant Eng.
Folding cartons, set up boxes,
labels.

SUNSET DIVISION

3720 South Soto St.
Los Angeles, Calif.
Bruce F. Brown, District Mgr.
H. D. Owen, Plant Mgr.
D. H. Stein, Board Mill Supt.
Capacity: 8 tons Board.

VERNON DIVISION

4444 Pacific Blvd.
Los Angeles, Calif.
Bruce F. Brown, District Mgr.
Harvey M. Brown, Res. Mgr.
U. G. Farmer, Plant Supt.
O. C. Majors, District Sales
Mgr.
B. F. Altick, Asst. Sales Mgr.
S. I. Wassell, Chief Eng.
Frank Wheelock, Chief Chem.
Bruce F. Brown, Jr., Asst.
Res. Chem.
E. Wilhelm, Chief Elect.
Geo. F. Ford, Converting
Plant Supt.
Mark Travis, Direct. Person-
nel.
A. Wilde, Finish. Room Supt.
M. G. Brown, Maint. Supt.,
Master Mech.
F. Crotchett, Night Bd. Mill
Tour Boss.
A. Dahl, Night Bd. Mill Tour
Boss.
E. Switzer, Night Bd. Mill
Tour Boss.
G. Eberhard, Day Bd. Mill
Tour Boss.
H. L. Miller, Office Mgr.
A. J. Smith, Purch. Agt.
B. J. Flynn, Ship. Supt.
Capacity: Paper: 150 tons Board.

SOUTH GATE DIVISION

4222 Santa Ana St.
South Gate, Calif.
L. B. Garlick, Jr., Res. Mgr.
F. W. Hill Converting Plant
Supt.
C. E. Chapel, Office Mgr.
S. T. McCloy, Chief Acct.
E. D. Conner, Plant Eng.
Wm. G. Russell, Shipping
Supt.
H. Reed, Personnel Dept.
T. D. Halliwell, Warehouse
Supt.
Lola Plumb, Head Nurse.
Corrugated Board.

ANTIOCH DIVISION

Antioch, Calif.
G. W. Harter, Res. Mgr.
Chas. M. Meyers, Supt.
Mabry Cone, Finish. Room
Supt.
C. M. Stitt, Plant Eng.
E. O'Connor, Chief Chem.
Walter Altizer, Chief Eng.
Capacity: Paper: 200 tons Board.

STOCKTON DIVISION

Stockton, California
Paul H. Keller, Res. Mgr.
V. A. Young, Chief Eng.
H. L. Rammer, Chief Chemist
Les Mullins, Bd. Mill Supt.
S. E. Stites, Chief Elect.
A. E. Bolter, Conv. Pit. Supt.
Harry Livezey, Conv. Pit. Supt.
Nels Anderson, Designing Eng.
Irl Harcourt, Plant Eng.
Chas. Orr, Maint. Supt.
J. A. Quinn, Purch. Agt.
W. W. Burke, Off. Mgr.
Capacity: Paper: 260 tons Board.

**FIR-TEX INSULATING
BOARD CO.**

Box 1186
St. Helens, Oregon

Peter Kerr, Pres.
James McDonald, Vice-Pres.
R. W. Simerai, Vice-Pres.
Gen. Mgr., Purch. Agt.
George Quigg, Gen. Supt.
John S. Coke, Sec.
N. J. Barbare, Treas.
Ray Hunzinger, Plant Eng.
Glenn W. Cheney, Sales Mgr.
J. G. Long, Chief Chemist
Raymond Hoxsey, Chief Elect.
Eugene Hegele, Off. Mgr.
John Robinson, Asst. Chem.
J. C. Moore, Supt. Shippg.
& Finish.
Glen Long, Tech. Dir.
Capacity: 250,000 sq. ft. Wood
Fibre Insulating Board daily
on 1/2-inch basis.

FLINTKOTE CO.

(Pioneer Division).

Los Angeles, Calif.
I. J. Harvey, Pres.
L. M. Simpson, Vice-Pres.,
Gen. Mgr.
W. A. Kinney, Prod. Mgr.
Glen A. Phillips, Supt.
C. T. Crawley, Purch. Agt.
John Van Ounsem, Tech. Dir.
M. E. Campbell, Chief Chem.
Dr. John J. Stanko, Research
Dir.
A. E. Carlson, Sales Mgr.
Board Div.
Capacity: Paper: 150 tons Board,
70 tons other.

**FRY ROOFING CO.,
LLOYD A.**

Headquarters Office: 5302 W.
66th St., Chicago, Ill.

Mill: 3750 N. W. Yeon Ave.
Portland, Ore.
B. B. Alexander, Gen. Mgr.
W. T. Woodward, Off. Mgr.
Capacity: Paper: 180 tons As-
phalt Prepared Roofing.

**GRAYS HARBOR PULP
& PAPER CO.**

Headquarters Office: Hammer-
mill Paper Co., Hammermill
Rd., Erie, Pa.

Mill Office: Hoquiam, Wash.
N. W. Wilson, Pres.
W. S. Lucey, Vice-Pres. &
Gen. Mgr.
W. F. Bromley, Sec.
W. T. Brust, Treas.
J. D. Sullivan, Purch. Agt.
Lyall Tracy, Res. Mgr.
L. W. Bagwill, Asst. Mgr.
Larry Hay, Office Mgr.

J. C. Mannion, Paper Mill
Supt.
L. G. Pfeffer, Paper Finish.
Supt.
George Brown, Conv. Foreman
G. W. McKay, Personnel &
Safety Supr.
Capacity: Paper: 68 tons Sul-
phites.

**HAWLEY PULP &
PAPER CO.**

Oregon City, Oregon

John H. Smith, Pres., Gen.
Mgr.
Carl E. Braun, Vice-Pres.,
Mill Mgr.
Austin Nickels, Gen. Supt.
Louis Woerner, Sec.
M. R. Lindle, Treas., Off.
Mgr.
K. G. Urfer, Purch. Agt.
Carl A. Sholdebrand, Sulphite
Supt.
A. D. Hofstedt, Sales Mgr.
E. Schwietz, Plant Eng.
L. Smith, Convert. Pit. Supt.
Clyde Helsby, Finish. Supt.
Lester Lloyd, Forester.
F. Weleber, Chief Chem.
L. Johnson, Chem.
J. A. Wilson, Asst. Mill Mgr.,
Asst. Sec.
Leslie D. Lloyd, Wood Buyer.
Henry Fischer, Wood Buyer.
James Hollender, Master Mech.
Paul Troeh, Sales Dept.
R. Tuttle, Sales Dept.
W. B. O'Malley, Sales Dept.
Sherman Hall, Sales Dept.
Capacity: Pulp: 205 tons Me-
chanical, 105 tons Unbleached
Sulphite. Paper: 150 tons
Newsprint, 100 tons Sulphites.

**INLAND EMPIRE
COMPANY**

Millwood, Wash.

A. W. Witherspoon, Pres.
L. A. Stillson, Vice-Pres.
C. A. Buckland, Gen. Mgr.
W. W. Witherspoon, Secy-
Treas.
J. L. Janacek, Gen. Supt.
M. W. Black, Sulphite Supt.,
Tech. Dir.
J. H. Butler, Jr., Pur. Agt.
F. W. Ancutt, Chief Eng.
Capacity: Pulp: 90 tons Me-
chanical, 33 tons Unbleached
Sulphite. Paper: 68 tons
Newsprint, 50 tons Sulphites.

**JOHNS-MANVILLE
PRODUCTS CORP.**

Headquarters Office: 22 East
40th St., New York, N. Y.

Mill Office: Pittsburg, Calif.
W. B. Kelley, Factory Mgr.
L. Bardsley, Supt. Paper Mill.
H. T. Broderson, Chief Chem.
F. V. Galbraith, Personnel
Mgr.
H. E. Miller, Plant Eng.
J. J. Shirley, Traffic Mgr.
Capacity: 30 tons Asbestos
Paper.

**LONGVIEW FIBRE
COMPANY**

Longview, Washington

H. L. Wollenberg, Pres.
D. C. Everest, Vice-Pres.
C. J. Schoo, Vice-Pres.
R. S. Wertheimer, Vice-Pres.,
Res. Mgr.
L. C. Peabody, Secy., Treas.,
Asst. to Pres.
Tony Siebers, Paper Mill Supt.
William E. Clarke, Asst.
Paper Mill Supt.
R. G. Armstrong, Asst. Secy.
C. R. Adams, Asst. Treas.
Carl Fahlstrom, Asst. Res.
Mgr.
H. Hoehe, Pulp Mill Supt.
M. V. Roley, Bag Mill Supt.
W. D. Rigg, Chief Eng.
J. W. Schuh, Chief Elect. Eng.
E. S. Umland, Fin. Rm. Supt.
D. H. Cairns, Chief Clerk,
Paper Dept.
Dave Watson, Purch. Agt.
J. A. Wilcox, Process. Eng.
C. J. Page, Box Pit. Supt.
Joe Fothergill, Safety Eng.
W. E. Thompson, Supt. Con-
struction.
H. W. Daunterman, Paper Mill
Tour Boss.
H. J. Drew, Paper Mill Tour
Boss.
C. J. Dupras, Paper Mill Tour
Boss.

Roy McCallum, Paper Mill Tour Boss.
W. A. Wenzel, Pulp Mill Tour Boss.
J. G. Carson, Pulp Mill Tour Boss.
J. L. LaPointe, Pulp Mill Tour Boss.
Gebhart Becker, Pipefitter Foreman.
C. G. Ditter, Chief Clk., Bag Plant.
F. A. Horn, Maint. Millwrt.
Virgil M. Sutherland, Chief Instr.
Capacity: Pulp: 100 tons Mechanical, 350 tons Unbleached Sulphate. Paper: 210 tons Sulphates, 230 tons Board.

OREGON PULP & PAPER CO.

Salem, Oregon

F. W. Leadbetter, Pres.
Theodore Osmund, Vice-Pres.
Pur. Agt.
Nils G. Teren, Vice-Pres., Gen. Mgr.
A. M. Cronin, Secy.
W. S. Walton, Treas.
K. W. Heinlein, Res. Mgr.
J. D. Kaster, Jr., Paper Mill Supt.
Edward A. Weber, Sulphite Supt.
Capacity: Pulp: 20 tons Unbleached Sulphite, 110 tons Bleached Sulphite. Paper: 120 tons Sulphites.

PACIFIC PAPER BOARD COMPANY

Longview, Washington

E. E. Flood, Pres.
Arthur C. Zimmerman, Vice-Pres. & Mgr.
Wray D. Farman, Secy. & Treas.
T. J. Kennedy, Asst. Secy. & Sales Mgr.
H. H. James, Purch. Agt.
Ralph Mason, Chief Eng.
Carl Troxel, Asst. Chief Eng.
E. F. Kremer, Auditor.
William Ball, Master Mech.
Jack Richmond, Asst. Mech.
Kenneth Gordon, Shpgg. Supt.
A. Duve, Paper Mill Tour Boss.
Capacity: Pulp: 30 tons Mechanical. Paper: 60 tons Board.

PACIFIC COAST PAPER MILLS OF WASH., INC.

Bellingham, Washington

J. J. Herb, Pres.
F. J. Herb, Vice-Pres. & Gen. Mgr.
V. A. Hughes, Secy.
William McCosh, Treas.
P. J. Onkela, Plant Supt., Purch. Agt.
George Johnstone, Master Mechanic.
William Dynes, Finish. Room Supt.
F. J. Block, Shpgg. Foreman.
Capacity: Paper: 22 tons Sulphites.

PACIFIC COAST PULP & PAPER CO.

Richvale, California

R. M. Thompson, Pres.
Fred E. Yokum, Charge of Production.
Capacity: Pulp: 5 tons Soda.

THE PARAFFINE COMPANIES, INC.

Emeryville, California

R. S. Shainwald, Ch. Bd.
W. H. Lowe, Pres.
R. H. Shainwald, Exec. Vice-Pres.
R. Hilliard, Vice-Pres. in Chg. Sales.
F. M. Prince, Vice-Pres. in Chg. Export.
F. M. Tussing, Mgr. of Mfg.
R. H. Ohea, Secy.
R. E. Dexter, Asst. Secy.
C. E. Howard, Asst. Secy.
F. M. Stires, Asst. Secy.
C. C. Gibson, Treas.
W. W. Boit, Asst. Treas., Asst. Secy.
Jean Holmes, Asst. Treas.
R. S. Bond, Asst. Treas.
J. H. Varley, Mill Supt.
A. H. Silverstone, Purch. Agt.
G. T. Kurtz, Chief Chemist.

S. A. Cohen, Dir. Research & Development.
William Gitter, Supt. Power Plant.
J. H. Stitt, Supt. Maint.
W. A. Magee, Mgr. Prod. Control.
I. Hovgaard, Asst. Mgr. Mfg.
L. Seifert, Supt. Shpgg.
Capacity: 120 tons Roofing and Felts, Floor Covering.

POWELL RIVER CO., LTD.

Headquarters Office: 1204 Standard Bank Bldg., Vancouver, B. C.

Mill Office: Powell River, B. C.

S. D. Brooks, Ch. Bd. Dir.
Harold S. Foley, Pres.
R. Bell-Irving, Vice-Pres.
G. F. Laing, Vice-Pres.
J. H. Lawson, Secy.
J. C. Hill, Asst. Secy.
J. N. Turvey, Asst. Treas.
D. A. Evans, Res. Mgr.
Russell M. Cooper, Gen. Supt.
R. A. Baker, Purch. Agt.
Ross Black, Mech. Supt.
R. C. Bledsoe, Chief Chem.
F. J. Hamilton, Sulphite Mill Supt.
W. E. MacGillivray, Groundwood Supt.
F. R. Riley, Paper Mill Supt.
J. F. Flett, Employment Supt.
A. H. Robertson, Plant Eng.
E. C. Craigie, Elec. Supt.
T. A. Wyborn, Steam Power Supt.
J. McIntyre, Safety Eng.
I. H. Andrews, Control Supt.
R. C. Mackenzie, Traffic Supt.
Angus Armour, Order & Shpgg. Dept. Head.
H. B. Urquhart, Asst. Groundwood Mill Supt.
W. A. Snyder, Asst. Paper Mill Supt.
N. C. Fraser, Finish. Room Supt.
A. W. DeLand, Mgr. Woods Dept.
Capacity: Pulp: 656 tons Mechanical, 155 tons Unbleached Sulphite. Paper: 720 tons Newsprint.

PUGET SOUND PULP & TIMBER CO.

Bellingham, Washington

Ossian Anderson, Pres.
Harry M. Robbins, Vice-Pres.
Ralph H. Miller, Dir.
J. L. Rucker, Dir.
Fred G. Stevenot, Dir.
Dr. William C. Keyes, Dir.
Walter DeLong, Oper. Mgr., Purch. Agt.
Lawson P. Turcotte, Sec. Treas.
Erik Ekholm, Gen. Supt.
Ralph M. Roberg, Sales Mgr., Traffic Mgr.
H. D. Cavin, Chief Eng.
E. Ericson, Chief Chem.
Frank Brown, Supt. Maint.
Robert H. Evans, Legal Counsel & Dir.
Russell E. DeLopez, Asst. Traffic Mgr.
Gordon Morseth, Shift Foreman.
Sid Collier, Shift Foreman.
Wm. E. Keyes, Shift Chemist.
Carl V. Sahlin, Wood Buyer.
Glenn Crout, Shpgg. Clerk.
Capacity: Pulp: 480 tons Unbleached Sulphite.

RAYONIER INCORPORATED

Head Office: 343 Sansome St.

San Francisco, Calif.

Mills: Shelton, Hoquiam, Port Angeles and Tacoma, Washington; Fernandina, Florida.
Edward M. Mills, Pres.
J. D. Zellerbach, Exec. Vice-Pres.
Charles H. Conrad, Secy-Treas.
L. G. Wilson, Comptroller.
Seattle Office: 719 White Bldg.
Seattle, Wash.
M. B. Houston, Vice-Pres.
Arthur W. Berggren, Asst. to Vice-Pres.
W. S. Lacey, Gen. Op. Mgr. four Washington Mills.
John Sullivan, Purch. Agt.
H. E. Kerry, Traffic Dir.
R. M. Pickens, Tech. Dir., Shelton, Wash.
A. N. Parrett, Research Dir., Shelton, Wash.

PACIFIC PULP & PAPER INDUSTRY

New York Office: 122 East 42nd Street.
Stewart E. Seaman, Director of Sales.

DIVISIONS

GRAYS HARBOR DIVISION

Hoquiam, Washington

Lyall Tracy, Res. Mgr.
John Bagwill, Asst. Mgr.
Larry Hay, Office Mgr.
O. R. McDonald, Pulp Mach. Room Supt.
A. Gustin, Sulphite Mill Supt.
C. H. Woodford, Woodroom Supt.
L. R. Wood, Plant Eng.
W. G. Clayton, Steam Plant Eng.
A. S. Boag, Chief Elect.
L. G. Pfeiffer, Pulp Finish. Supt.
O. N. Sanger, Chief Chem.
Olavi Aho, Asst. Chief Chem.
G. W. McKay, Personnel & Safety Suprv.
Capacity: Pulp: 300 tons Bleached Sulphite.

PORT ANGELES DIVISION

Port Angeles, Wash.

W. E. Brettenbach, Res. Mgr.
H. A. Sprague, Asst. Res. Mgr.
C. T. Mulledy, Supt.
J. G. Hardy, Asst. Supt.
S. W. Grimes, Personnel & Safety Suprv.
Otto Frame, Pulp Mach. Rm. Supt.
G. L. Johnston, Sawmill & Shipping Plant Supt.
Meder Johnson, Res. Eng.
Fred Dangerfield, Mtr. Mech.
Pat Cannon, Steam Pit. Supt.
H. H. Lawson, Pulp Finish. Foreman.
H. Springer, Chief Elect.
H. T. Fretz, Chief Chem.
Henry V. Charnell, Jr., Asst. Chief Chem.
Myron A. Scott, Office Mgr.
Capacity: Pulp: 260 tons Bleached Sulphite.

SHELTON DIVISION

Shelton, Wash.

George Cropper, Res. Mgr.
F. R. Pearson, Asst. Mgr.
A. S. Viger, Supt.
M. C. Kaphingst, Asst. Supt.
W. J. Merrick, Office Mgr.
G. C. Craik, Personnel & Safety Suprv.
L. E. Attwood, Pulp Mach. Rm. Supt.
A. J. Ferguson, Woodroom Supt.
J. G. E. Ellis, Plant Eng.
W. F. McCann, Master Mech.
W. A. McKenzie, Steam Pit. Eng.
W. W. Kullrich, Chief Elect.
V. T. Morgan, Pulp Finish. Foreman.
Winston Scott, Chief Chem.
G. C. Eck, Asst. Chief Chem.
Capacity: Pulp: 260 tons Bleached Sulphite.

TACOMA DIVISION

Tacoma, Wash.

George Cropper, Res. Mgr.
F. R. Pearson, Asst. Mgr.
E. C. Lemley, Supt.
R. E. Fetterly, Personnel & Safety Suprv.
R. M. Cohoon, Woodroom Supt.
R. L. Kettenring, Plant Eng.
L. L. Hoff, Master Mech.
T. A. Manteufel, Steam Plant Eng.
George A. Durkee, Chief Chem.
N. Eldon Anderson, Asst. Chief Chem.
Capacity: Pulp: 140 tons Unbleached Sulphite.

ST. HELENS PULP & PAPER CO.

St. Helens, Oregon

Max Oberdorfer, Pres., Gen. Mgr.
Dr. Robert H. Ellis, Vice-Pres.
Max Oberdorfer, Jr., Asst. Mgr.
Irving T. Rau, Sec., Treas., Purch. Agt.
Sverre Strom, Chief Eng.
R. E. Drane, Chief Chem.
A. A. Weber, Asst. Off. Mgr.
L. V. Radke, Asst. Chem.

C. W. Sherman, Mgr. Bag Mill, Mgr. Converting Dept.
C. V. Smith, Chief Elect.
B. Pasero, Dir. Personnel.
H. C. Stoddard, Eng.
J. Zankner, Fin. Room Supt., Shpgg. Supt.
H. R. O'Dell, Maint. Supt.
F. Monahan, Paper Mill Supt.
Ray Brown, Pulp Mill Supt.
C. Gillihan, Safety Eng.
H. C. Carswell, Timber Mgr.
J. A. Moore, Traffic Mgr.
Capacity: Pulp: 150 tons Unbleached Sulphate. Paper: 140 tons Sulphates.

ST. REGIS PAPER COMPANY

KRAFT PULP DIVISION

Headquarters Office: 230 Park Ave. New York, N. Y.

Mill Office: Tacoma, Wash.

Roy K. Ferguson, Pres.
Ossian Anderson, Vice-Pres.
Niles M. Anderson, Mill Mgr.
J. Lamb, Purch. Agt.
E. J. Hayes, Office Mgr.
A. M. Cadigan, Tech. Dir.
Claude B. Christiansen, Tech. Asst.
Paul Holmes, Chief Eng.
W. J. Thomas, Chief Elect.
Ivan Ginrich, Asst. Chief Eng.
Carl Soderlund, Master Mech.
O. Reisinger, Timekeeper.
Grant D. Ross, Plant Eng.
R. G. Murphy, Supt. Ship. Burt Doolittle, Wood Mill Foreman.
Rex Campbell, Tour Foreman.
M. Lindley, Tour Foreman.
H. Trigg, Tour Foreman.
Ossian Anderson, Tour Foreman.
A. C. McCorry, Asst. Supt.
Capacity: Pulp: 325 tons Unbleached Sulphate Pulp.
Bleaching Capacity: 250 tons.

SIDNEY ROOFING & PAPER CO., LTD.

Victoria, British Columbia.

R. W. Mayhew, Vice-Pres.
C. Alan Mayhew, Vice-Pres.
Logan Mayhew, Manag. Dir., Purch. Agt.
A. D. Macfarlane, Secy.
M. Thom, Supt.
D. Thom, Chief Boiler Eng.
A. J. Saunders, Pit. Eng. (Mech.)
G. M. Lindsay, Beater Foreman.
Capacity: Pulp: 10 tons Mechanical. Paper: 30 tons Board, 25 tons other.

SORG PULP CO., LTD.

Port Mellon, British Columbia.

J. A. Aull, Pres.
E. T. Turner, Exec. Vice-Pres.
R. H. Tupper, Legal Repr. in B. C.
Trig Iverson, Gen. Supt.
Capacity: Pulp: 120 tons Unbleached Sulphate.

SOUNDVIEW PULP CO.

Everett, Wash.

Walter A. Starr, Chair. Bd. Dir.
U. M. Dickey, Pres.
H. H. Fair, Vice-Pres. & Treas.
L. S. Burdon, Gen. Mgr.
G. J. Armbruster, Gen. Supt.
E. A. Salmonson, Asst. Supt.
H. L. Barbash, Secy.
Miss E. Johnson, Purch. Agt.
N. W. Coster, Tech. Dir.
Arthur E. Duke, Master Mech.
J. H. McCarthy, Res. Eng.
Carl A. Ramstad, Chg. Instrumentation.
Capacity: Pulp: 500 tons Bleached Sulphite.

SPAULDING PULP & PAPER COMPANY

Box 70.

Newberg, Ore.

J. C. Compton, Pres., Gen. Mgr.
E. Fred Emery, Vice-Pres.
O. M. Allison, Sec., Treas.
J. B. Wilt, Res. Mgr., Plant Supt.

Ralph Reid, Chief Chem.,
Tech. Advisor.
H. M. Washbond, Auditor,
Chief Acct., Office Mgr.
Capacity. Pulp: 80 tons Un-
bleached Sulphite.

UNITED STATES GYPSUM COMPANY

Southgate, (Los Angeles) Calif.
F. W. Adams, Mill Mgr.
W. T. Tillotson, Mgr. Roofing
Paper Dept.
J. E. Hartford, Paper Ma-
chine Supt.
Capacity. Paper: 70 tons Board,
50 tons other.

VOLNEY FELT MILLS

Compton Calif.
Lloyd A. Fry, Pres.
H. J. Colman, Vice-Pres.
J. J. Kennedy, Secy.
J. F. Fisher, Treas.
William Henry, Mill Mgr.,
Purch. Agt.
J. D. Beatty, Supt.
Capacity: 30 tons Felts.

WESTMINSTER PAPER COMPANY, LTD.

J. J. Herb, Pres.
E. M. Herb, Vice-Pres., Gen.
Mgr.
R. C. Onkels, Supt.
J. Ashby, Purch. Agt.
Cliff Radcliff, Sales Mgr.

H. Mackle, Master Mech.
Capacity. Paper: 40 tons Sul-
phites.

WEST COAST PAPER BOARD MILLS, INC.

Los Angeles, California.
W. H. Kewell, Director.
Capacity. Paper: 20 tons Chip
Board.

WEYERHAEUSER TIMBER CO.

PULP DIVISION
Longview, Washington.
R. B. Wolf, Mgr.

Mill No. 1, Longview, Wash.
(Cowlitz County)
W. N. Kelly, Mgr.
G. H. McGregor, Supt.
E. P. Wood, Tech. Dir.
D. K. MacBain, Plant Eng.
P. F. Miescke, Chief Acct.
C. L. McPhail, Purch. Agt.
Capacity. Pulp: 250 tons
Bleached Sulphite.

Mill No. 2, Everett, Wash. (Sno-
homish County)
R. J. LeRoux, Mgr.
H. W. Blakowsky, Tech. Dir.
G. F. Alcorn, Plant Eng.
O. E. Fox, Chief Acct.
R. M. Inkster, Pur. Agt.
Capacity. Pulp: 260 tons
Unbleached Sulphite.

UNITED STATES PULPWOOD IMPORTS

(Unit: 1 Cord—128 Cu. Ft.)

	Rough	Peeled	Rossed	Chipped	Total
1941*	109,533	1,155,820	1,361	25,926	1,292,640
1940	240,045	1,118,474	29,482	47,719	1,435,720
1939	237,898	821,186	27,352	44,438	1,130,874
1938	290,453	949,707	15,636	38,142	1,293,938
1937	274,470	1,185,687	24,309	38,402	1,522,868
1936	200,701	977,460	31,597	-----	1,209,758
1935	99,659	937,428	425	-----	1,037,332
1934	180,019	789,158	4,801	-----	973,978
1933	119,852	591,812	11,544	-----	723,208
1932	114,366	531,158	2,664	-----	648,188
1931	186,613	817,926	17,128	-----	1,021,667
1930	331,158	1,234,678	16,365	-----	1,582,201

Source: Department of Commerce, Bureau of Foreign and Domestic
Commerce.

*Figures available for nine months of 1941 only.

Pulp Production Ahead In First Three Months

● Production of wood pulp, which set a record in 1941, is still increasing according to the report of the United States Pulp Producers Association. For the first three months of 1942, production of all grades totaled 2,757,025 tons as compared with 2,358,380 tons in the same period of 1941, a gain of 398,645 tons or 17 per cent.

Canadian production also gained according to the Canadian Pulp & Paper Association, 1,515,116 tons in the first three months against 1,187,888 tons in the same 1941 period, an increase of 327,228 tons or 27.5 per cent. The combined production of American and Canadian pulp mills in the first quarter of 1942 amounted to 4,272,141 tons compared with 3,546,268 tons, a gain of 725,873 tons or 20.4 per cent.

Bleached sulphite pulp production in the first quarter jumped from 396,486 tons in 1941 to 456,235 tons in 1942, up 49,749 tons. Unbleached sulphite also increased from 267,434 tons to 343,027 tons, a gain of 75,593 tons. Bleached sulphate production declined 6,358 tons, from 171,778 tons in the first quarter of 1941 to 165,420 tons in the same quarter this year. However, unbleached sulphate rose from 863,402 tons last year to 1,038,699 tons in the first quarter this year, a gain of 175,297 tons. Soda likewise increased from 143,104 tons to 165,749 tons, a gain of 22,645 tons.

Semi-chemical pulp production rose to 60,075 tons, a gain of 13,710 tons over the first quarter of 1941 when 46,365 tons were produced. Mechanical pulp production of 522,351 tons in the first quarter was 56,551 tons higher than the 466,800 tons in the first quarter of 1941.

In the first quarter of the current year pulp used by producing mills or subsidiaries was up 16 per cent. Shipments to the domestic market were up 14 per cent over a year ago. Exports declined 7 per cent. Stocks on hand for own use at the end of March were 32 per cent below stocks at the end of March, 1941, while stocks on hand for outside market were down 60 per cent below those a year ago.

STRIKE DOWN THIS MONSTER!



FOREST FIRES
DELAY VICTORY

Reprinted from The American Weekly, May 17, 1942

HOW TO PREVENT FOREST FIRES



MATCHES. Do not use matches in the forest. If you must use them, use them in a safe place clear of all inflammable material.
SMOKING. Smoke only while stopping in a safe place clear of all inflammable material.
TOBACCO. Do not use pipe and cigar or cigarette butts are dead before throwing them away. Never throw them into brush, trees, or under logs.
MAKING CAMP. Before building a fire scrape away all inflammable material from a spot four feet in diameter. Dig a hole in the center and in it build your campfire. Keep your fire small. Never build a campfire or log or ever tent.
BREAKING CAMP. Never leave camp until your fire is out — dead out. Always leave a clean camp.

HOW TO PUT OUT A CAMPFIRE. Dig the ends while making them with water. Turn small sticks and break both sides. Wet the ground around the fire. Be sure the last spark is dead.
BRUSH BURNING. Never burn brush or leaves in windy weather or while there is the slightest danger that the fire will get away.
EXTINGUISH any small fire you can.
REPORT any fire you discover. Go to the nearest telephone and ask for the local Forest Ranger or Fire Warden.

Forest Service

American Pulp and Paper Industry Working For Victory

Last year's record demand for products successfully met
 ✓ ✓ ✓ Shift to war basis, begun in 1941, now accelerating
 ✓ ✓ ✓ Operations for duration will depend upon use of
 products for essential war and civilian purposes ✓ ✓ ✓
 Foresight of American pulp producers avoids serious short-
 age of vital war materials.

THE year 1941 presented a challenge to the pulp, paper and paperboard industry of the United States to meet a record demand for its products. The challenge was successfully met with only temporary shortages in a few grades.

The transition from a peace to a war economy was in the early stages. Stimulated indirectly by the enormous expenditures for armaments, civilian industries sought more of the industry's output than ever before. The use of pulp, paper and paperboard by war industries was on the increase but was far from its maximum. The peak civilian demand coupled with the expanding war demand kept the mills running beyond rated capacity all year. It was not until November that production began to eat into the order backlog.

The stage was being set for a changeover to a war economy. Restrictions were imposed but only the curtailment of chlorine usage beginning in midyear forced a large part of the industry to alter its manufacturing procedures. It caused quite a stir at the time but such is the adaptability of the industry that it did better with what chlorine it was allotted than had been anticipated. Priorities were a nuisance but not until late in the year did they become a serious problem to maintain-

ing operations. Proof of necessity usually resulted in securing the needed material, partly because the war industries were far below their peak requirements and partly be-

cause knowledge of how much we could produce and how much we needed was still lacking.

Waste paper supplies were short in the Middle West and in the East and some board mills were reported to have slowed down for lack of raw material, but the drives for the collection of waste papers brought out more than enough. Pacific Coast board mills were not affected by a shortage in the supply of waste papers. By early 1941 most paper mills, accustomed to using furnishes made up largely of Scandinavian pulp, had adjusted their operations to domestic and Canadian pulps and considered that problem as belonging to the past.

The feeling throughout industry that the maintenance of operations would become increasingly difficult pervaded the management of the pulp, paper and paperboard mills. The belief that the entrance of the United States into the war was only a question of time, spurred the more foresighted operators into planning how they could keep operating during the war. Plants were maintained in good physical condition, programs for conservation, substitution and salvaging were instituted. Plans were laid to adjust products to the needs of the growing armament production in order that operations

1941

TOTAL WOOD PULP, ALL GRADES

CAPACITY 11,002,200	
CONSUMPTION 10,601,223	
CHEMICAL PULPS 8,733,223	81%
PRODUCTION 8,978,400	
CHEMICAL PULPS 8,111,400	90%
GROUNDWOOD 826,000	9%
DOMESTIC SALES 1,732,727	
CHEMICAL PULPS 1,674,727	97%
IMPORTS 1,143,000	
CHEMICAL PULPS 941,000	82%
EXPORTS 322,177	
CHEMICAL PULPS 317,177	98%

United States Pulp Producers Association

UNITED STATES WOOD PULP PRODUCTION BY REGIONS—1941

(Tons of 2,000 Pounds)

Region	Total All Grades	Total Sulphite	Bleached Sulphite	Unbleached Sulphite	Total Sulphate	Bleached Sulphate	Unbleached Sulphate	Groundwood	Soda	Semi-Chemical
West Coast	1,994,150	1,198,172	611,337	586,835	433,117	96,668	336,449	324,556	**	35,606
New England	1,461,100	639,849	396,207	243,642	27,083	0	27,083	652,509	138,413	0
Middle Atlantic	774,197	254,274	98,923	155,351	*	0	*	305,467	210,601	3,855
Lake States	1,482,353	681,849	474,032	207,817	315,596	69,437	246,159	407,660	70,507	1,443
South	4,266,290	122,856	122,801	55	3,611,762	521,477	3,090,285	171,791	195,158	163,096
Totals	9,978,090	2,897,000	1,703,300	1,193,700	4,387,558	687,582	3,699,976	1,861,983	614,679	204,000

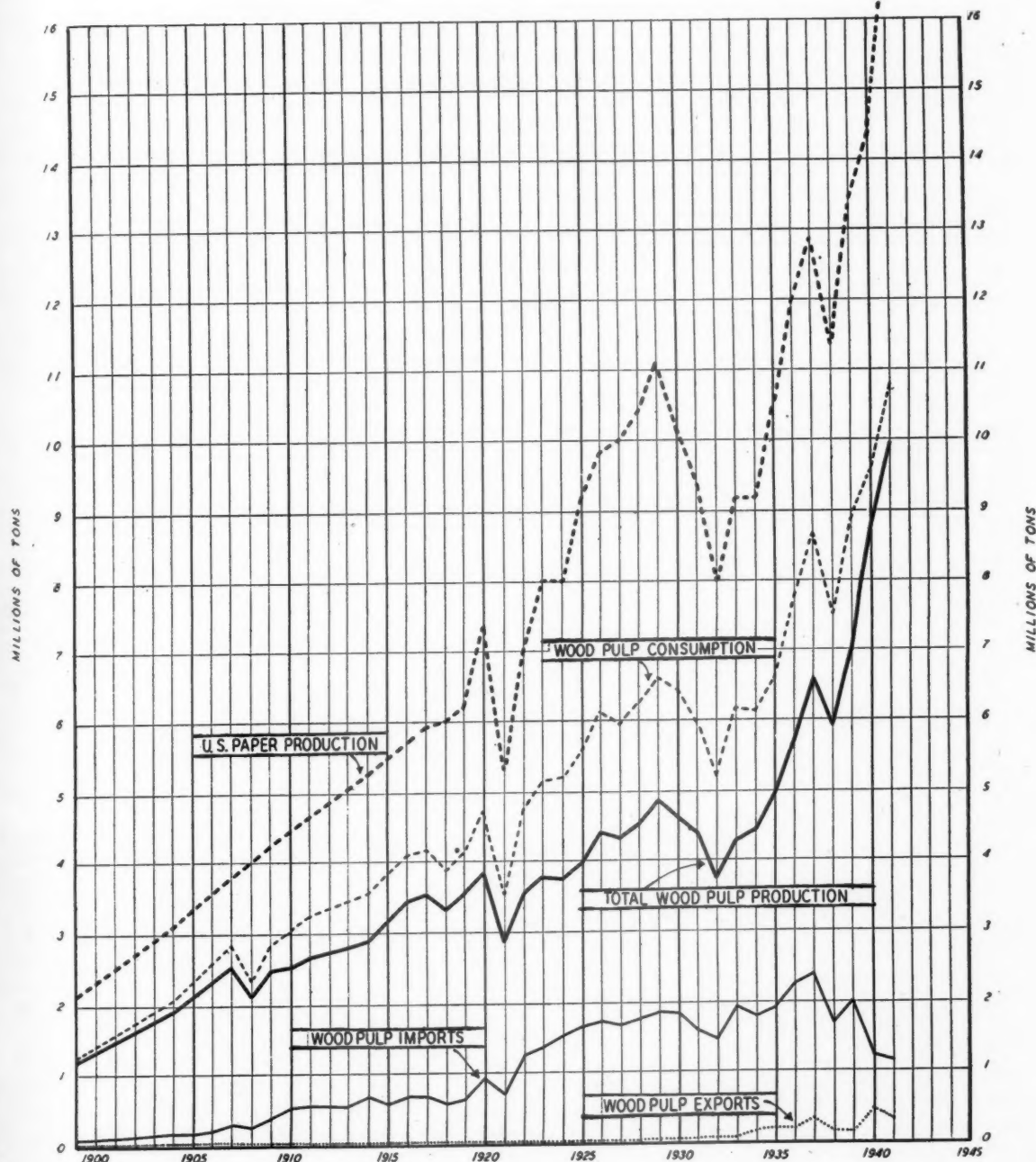
*Included in New England's total to avoid disclosing one company's data.

**Included in Lake States' total to avoid disclosing one company's data.

Source: As reported to the United States Pulp Producers Association and the Soda Pulp Manufacturers Association by 98 per cent of the industry and estimated for the remaining 2 per cent.

Total screenings produced during 1941 amounted to 12,870 tons. Production by regions as follows: New England, 3,246 tons; Lake States, 5,298 tons; West Coast, 2,699 tons and South, 1,627 tons and are included in the totals.

**TOTAL WOOD PULP PRODUCTION, CONSUMPTION, IMPORTS
AND EXPORTS AND TOTAL PAPER PRODUCTION
(17,280,000)
OF THE UNITED STATES**



Sources for Paper Production - U.S. Bureau of the Census except
1924, 1926 & 1941 estimated by American Paper & Pulp Association
for Pulp Production - 1899-1940 U.S. Bureau of the Census
1941 estimated by U.S. Pulp Producers Association
Imports & Exports - U.S. Bureau of Foreign & Domestic Commerce

United States Pulp Producers Association

could continue despite a declining civilian demand which they foresaw. Patriotism was an important factor in shaping this changeover. The managements of many plants felt it

was their duty to take the initiative in helping the Army, the Navy and war industries get what pulp and paper products they needed, and to help them develop new ones.

The shift away from a civilian economy with a superimposed war economy is still incomplete today but the pattern is much clearer than it was a few months ago. Fateful

UNITED STATES WOOD PULP PRODUCTIONS BY REGIONS—1940

Source: United States Pulp Producers Association
(Tons of 2,000 Pounds)

Region	Total All Grades	Total Sulphite	Bleached Sulphite	Unbleached Sulphite	Total Sulphate	Bleached Sulphate	Unbleached Sulphate	Ground-Wood	Soda	Special & Off-Quality
West Coast	1,817,138	1,102,511	608,984	493,527	351,764	90,209	261,555	326,283	*	36,580
New England	1,316,447	545,947	374,689	171,258	*	*	*	650,039	120,461	
Middle Atlantic	690,056	225,792	96,335	129,457	*	*	*	282,386	181,878	
Lake States	1,320,012	600,782	418,024	182,758	274,172	58,067	216,105	374,325	70,733	**
South	3,837,347	113,968	113,968		3,098,064	404,724	2,693,340	327,967	168,928	128,420
Totals	8,981,000	2,589,000	1,612,000	977,000	3,724,000	553,000	3,171,000	1,961,000	542,000	165,000

*Included in Lake States' total to avoid disclosing one company's data.

**Included in Pacific States' total to avoid disclosing one company's data.

Source: As reported to the United States Pulp Producers Association and the Soda Pulp Manufacturers Association by 90 per cent of the industry and estimated for the remaining 10 per cent.

UNITED STATES WOOD PULP PRODUCTION BY REGIONS—1939

Source—United States Pulp Producers Association
(Tons of 2,000 Pounds)

Region	Total All Grades	Total Sulphite	Bleached Sulphite	Unbleached Sulphite	Total Sulphate	Bleached Sulphate	Unbleached Sulphate	Ground-wood	Soda	Semi-Chemical
West Coast	1,384,147	780,083	431,661	348,422	297,088	78,252	218,836	271,798	21,000	14,178
New England	1,070,927	436,117	281,713	154,404	(¹)		(¹)	523,666	110,026	1,118
Middle Atlantic	579,713	177,743	84,344	93,399				244,746	157,224	
Lake States	1,154,741	541,008	397,233	143,775	231,376	46,035	185,341	333,283	45,000	4,074
South	2,927,472	35,049	35,049		2,473,536	307,713	2,165,823	76,507	131,750	210,630
Totals	7,117,000	1,970,000	1,230,000	740,000	3,002,000	432,000	2,570,000	1,450,000	465,000	230,000

¹ Included in Lake States' to avoid disclosing individual mill's data.

Source: As reported to the United States Pulp Producers Association by 91 per cent of the industry and estimated for 9 per cent.

TOTAL UNITED STATES PRODUCTION OF WOOD PULP By Grades—1925-1941

(Tons of 2000 pounds)

Year.	Total	Unbleached Sulphite	Bleached Sulphite	Total Sulphate	Groundwood	Soda	All Other
1925	3,962,217	790,510	612,576	409,768	1,612,019	472,647	64,697
1926	4,394,766	911,729	646,466	519,960	1,764,248	496,920	55,463
1927	4,313,403	872,411	680,288	603,253	1,610,409	487,478	59,564
1928	4,510,800	836,751	722,107	774,225	1,610,988	488,641	78,088
1929	4,862,885	848,754	839,953	910,888	1,637,653	520,729	104,908
1930	4,630,308	815,897	751,166	949,513	1,560,221	474,230	79,281
1931	4,409,344	675,859	740,812	1,034,291	1,449,240	374,054	135,088
1932	3,760,267	548,702	596,937	1,028,846	1,203,044	290,703	92,035
1933	4,276,204	601,102	726,473	1,259,351	1,197,553	457,790	33,935
1934	4,281,428	599,905	806,612	1,240,967	1,253,398	477,089	35,457
1935	5,032,299	634,947	944,620	1,467,749	1,355,819	485,162	144,002
1936	5,695,219	693,903	1,127,039	1,794,734	1,475,620	557,695	46,228
1937	6,713,576	791,575	¹ 1,348,669	2,139,087	1,600,667	507,548	326,030
1938	5,933,560	601,855	² 1,004,621	2,443,057	1,333,308	395,307	155,418
1939	6,993,334	729,203	³ 1,217,249	2,962,657	1,444,875	441,565	357,929
1940	8,851,740	990,668	⁴ 1,601,016	3,725,135	1,762,821	548,047	164,940
1941	9,978,400	1,193,700	1,703,300	4,387,837	1,867,000	609,300	217,263

¹For 1937: "Superpurified" and "Rayon and special grades" combined amounted to 353,640 tons.

²For 1938: "Superpurified" and "Rayon and special grades" combined amounted to 228,261 tons.

³For 1939 "Superpurified" and "Rayon and special grades" combined amounted to 193,420 tons.

⁴Includes "Superpurified" and "Rayon and special grades" to avoid disclosing figures for individual establishments for 1940.

Source: From 1925 through 1933 and for 1935 through 1940, U. S. Census. 1934 and 1941 data from United States Pulp Producers Association. 1941 figures are estimates by United States Pulp Producers Association.

SUMMARY FOR 1941 OF UNITED STATES WOOD PULP PRODUCTION, SHIPMENTS and STOCKS

Tons of 2,000 lbs., air dry weight.

	Production	Used	Shipments		Stocks on Hand	
			Domestic Market	Export**	End of Period	
Total All Grades, 1941	9,978,090	8,040,305	1,723,584	306,095	96,572	188,466
Total Sulphite	2,897,000	1,558,411	1,228,530	156,756	36,064	82,761
Total Bleached Sulphite	1,703,300	865,666	767,970	97,633	21,612	49,581
Rayon	214,767	1,684	196,564	27,505	4,405	15,391
Other	1,488,533	863,982	571,406	70,128	17,207	34,190
Total Unbleached Sulphite	1,193,700	692,745	460,560	59,123	14,452	33,180
Total Bleached Sulphate	687,582	604,111	72,968	10,377	4,378	4,252
Total Unbleached Sulphate	3,699,976	3,355,903	246,373	132,162	9,553	44,015
Total Soda	614,679	506,682	111,200	1,800	3,357	8,460
Semi-Chemical	204,000	203,921	0	0	83	4
Chemical Screenings	10,870	4,475	6,513	0	692	810
Groundwood	1,861,983	1,804,643	57,862	5,000	42,195	47,717
Groundwood Screenings	2,000	2,059	138	0	250	447

*Covers only pulp manufactured by producing mills or transferred to their subsidiaries. Does not include purchased pulp.

**Covers only shipments made for export during 1941 as reported by the producing mills. Does not include exports that may have been made from stocks of purchased pulp held by agents.

Source: As reported to the United States Pulp Producers Association and the Soda Pulp Manufacturers Association by 98 per cent of the industry and estimated for remaining 2 per cent.

SUMMARY FOR 1940 OF UNITED STATES WOOD PULP PRODUCTION, SHIPMENTS and STOCKS*

Tons of 2,000 lbs., air dry weight

	Production	Used	Shipments		Stocks on Hand	
			Domestic Market	Export	End of Period	
					12/31/40	1/1/40
Total All Grades, 1940*	8,981,000	9,724,643	1,323,000	480,926	153,538	159,415
Total Sulphite	2,589,000	3,024,559	966,400	390,747	88,621	85,844
Total Bleached Sulphite	1,612,000	1,746,459	611,400	218,457	42,884	54,000
Rayon	288,500	287,241	157,700	115,204		
Other	1,323,500	1,459,218	453,700	103,253		
Total Unbleached Sulphite	977,000	1,278,100	355,000	72,290	32,971	31,693
Total Bleached Sulphate	553,000	619,682	75,400	18,205	3,910	15,794
Total Unbleached Sulphate	3,171,000	3,237,009	143,000	157,568	29,423	17,759
Total Soda	542,000	383,421	97,400	10,006	8,460	
Total Groundwood	1,961,000	2,130,747	40,800	1,766	35,890	37,182
Total Other Pulps	165,000					2,836

*Source: United States Pulp Producers Association.

UNITED STATES

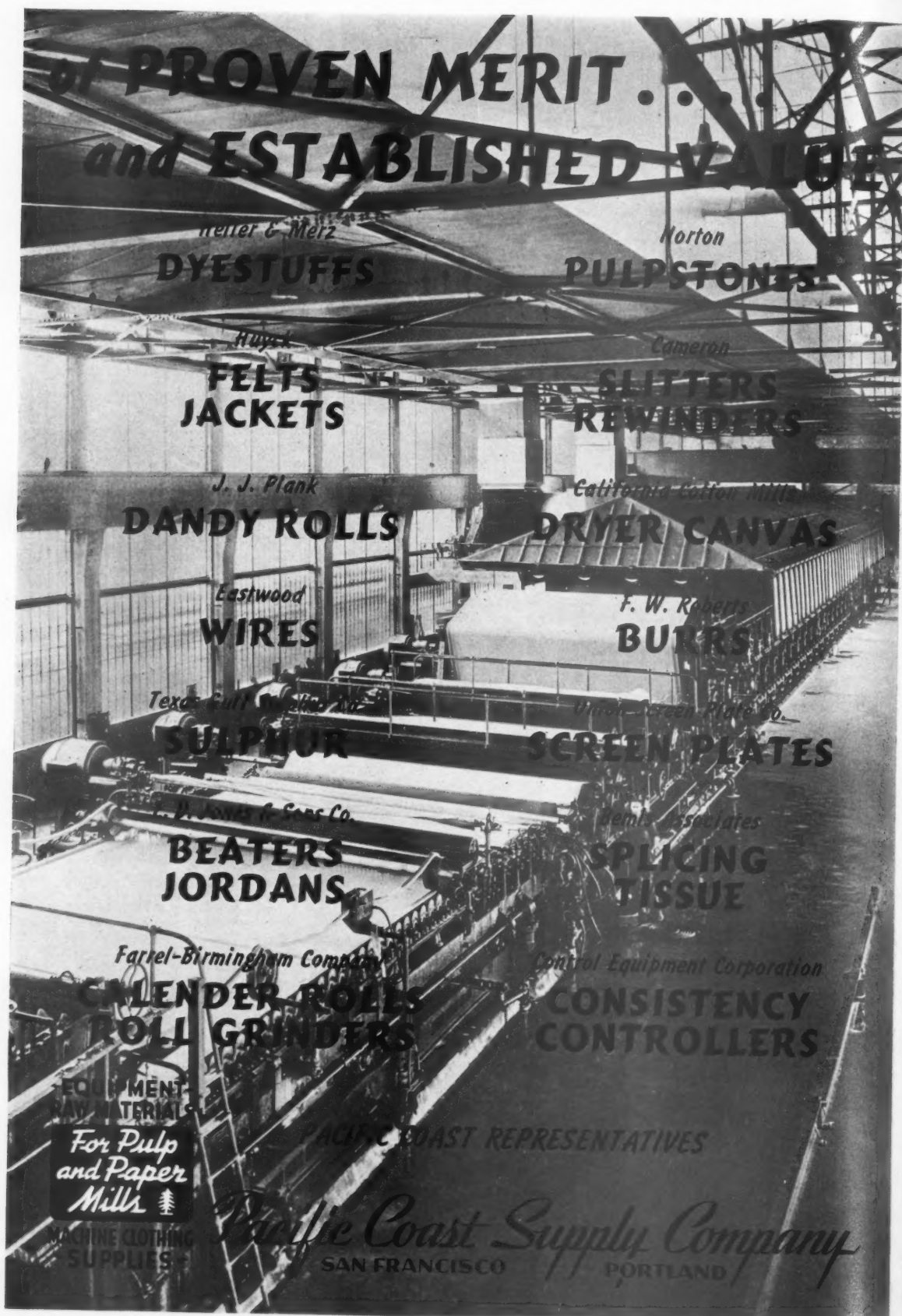
Paper and Woodpulp Production and Consumption Consumption of Domestic and Imported Pulpwood and Total Pulpwood Consumption Specified Years, 1899-1941

Year—	PAPER		WOODPULP		CONSUMPTION OF PULPWOOD		
	Production (tons)	Consumption (tons)	Production (tons)	Consumption (tons)	Domestic (cords)	Imported (cords)	Total (cords)
1899.....	2,167,593	2,158,000	1,179,525	1,216,254	1,617,093	369,217	1,986,310
1904.....	3,106,696	3,049,824	1,921,768	2,091,006	2,477,099	573,618	3,050,717
1909.....	4,216,708	4,224,000	2,495,523	2,856,593	3,207,653	793,954	4,001,607
1914.....	5,270,047	5,496,164	2,893,150	3,556,377	3,641,063	829,700	4,470,763
1917.....	5,919,647	6,255,725	3,509,939	4,148,600	4,706,327	773,748	5,480,075
1918.....	6,051,523	6,387,066	3,313,861	3,869,746	4,506,276	744,518	5,250,794
1919.....	6,190,361	6,479,490	3,517,952	4,113,911	4,445,817	1,032,015	5,477,832
1920.....	7,334,614	7,846,827	3,821,704	4,696,035	5,014,513	1,099,559	6,114,072
1921.....	5,356,317	6,053,915	2,875,601	3,544,218	3,740,406	816,773	4,557,179
1922.....	7,017,800	8,007,088	3,521,644	4,756,105	4,498,808	1,050,034	5,548,842
1923.....	8,029,482	9,339,573	3,788,672	5,149,695	4,636,789	1,236,081	5,872,870
1924.....			3,723,266	5,216,265	4,720,191	1,047,891	5,768,082
1925.....	9,182,204	10,590,090	3,962,217	5,590,304	5,005,445	1,088,376	6,093,821
1926.....			4,394,766	6,096,279	5,489,517	1,276,490	6,766,007
1927.....	10,002,070	11,915,233	4,313,403	5,960,865	5,526,889	1,224,046	6,750,935
1928.....	10,403,338	12,447,841	4,510,800	6,239,641	5,750,689	1,409,411	7,160,100
1929.....	11,140,235	13,347,925	4,862,885	6,704,341	6,411,566	1,233,445	7,645,011
1930.....	10,169,140	12,314,819	4,630,308	6,463,185	6,089,852	1,105,672	7,195,524
1931.....	9,381,840	11,403,850	4,409,344	6,005,718	5,896,446	826,320	6,722,766
1932.....	7,997,872	9,733,764	3,760,267	5,083,446	4,891,424	741,699	5,633,123
1933.....	9,190,017	10,919,391	4,293,344	6,027,088	5,933,295	628,379	6,561,674
1934.....	9,186,266	11,185,682	4,281,428	5,969,633	5,822,681	973,978	6,796,659
1935.....	10,506,195	12,490,886	4,944,226	6,877,869	6,590,942	1,037,332	7,628,274
1936.....	11,670,000	14,546,046	5,695,219	7,420,829	7,506,156	1,209,760	8,715,916
1937.....	12,600,000	15,798,362	6,617,184	8,692,489	8,870,932	1,522,868	10,393,800
1938.....	11,327,000	13,488,300	5,933,060	7,975,000	7,900,053	1,293,938	9,193,991
1939.....	13,509,642	15,930,349	6,993,334	9,058,415	9,685,592	1,130,874	10,816,466
1940.....	14,483,709	16,620,632	8,851,740	9,724,643	12,564,180	1,435,820	13,742,958
1941.....	17,280,000	19,768,325	9,978,400	10,801,223	15,400,000	1,292,640†	16,692,640

Source: Bureau of the Census, United States Forest Service and A. P. & P. A. Bureau Foreign and Domestic Commerce, U. S. Pulp Producers Association.

*Pulpwood requirement is a computed figure which represents the pulpwood required to manufacture the total paper consumption of a year.

†Available for nine months of 1941 only. Other 1941 figures estimated for 12 months.



**of PROVEN MERIT...
and ESTABLISHED VALUE**

Hetter & Merz
DYESTUFFS

Horton
PULPSTONES

Huyck
**FELTS
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WIRES

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**For Pulp
and Paper
Mills**

**MACHINE CLOTHING
SUPPLIES**

PACIFIC COAST REPRESENTATIVES

Pacific Coast Supply Company
SAN FRANCISCO PORTLAND

1941 TOTAL SULPHITE PULP

(IN TONS OF 2,000 POUNDS)

CONSUMPTION 3,457,000	
BLEACHED 1,980,300 57%	UNBLEACHED 1,476,700 43%
CAPACITY 3,164,000	
BLEACHED 1,804,400 57%	UNBLEACHED 1,359,600 43%
PRODUCTION 2,897,000	
DOMESTIC SALES 1,228,530	
BLEACHED 757,970 62%	UNBLEACHED 460,560 37%
IMPORTS 740,000	
BLEACHED 389,000 52%	UNBLEACHED 351,000 47%
EXPORTS 180,000	
BLEACHED 102,000 62%	UNBLEACHED 68,000 38%

United States Pulp Producers Association

December 7th pointed the way to a rapid change to a maximum war economy and a minimum civilian economy.

Whether maximum war demands upon the industry plus minimum ci-

1941 BLEACHED SULPHITE PULP

(IN TONS OF 2,000 POUNDS)

CONSUMPTION 1,980,300	
PAPER GRADES 1,677,533 85%	RAYON 302,767 15%
CAPACITY* 1,804,400	
PRODUCTION 1,703,300	
DOMESTIC SALES 767,970	
PAPER GRADES 571,406 74%	RAYON 196,564 26%
IMPORTS 389,000	
PAPER GRADES 267,000 69%	RAYON 122,000 31%
EXPORTS 112,000	
PAPER GRADES 76,000 70%	RAYON 34,000 30%

* 212,500 Tons additional bleaching capacity utilized for Unbleached Sulphite
United States Pulp Producers Association

vilian requirements will keep the pulp, paper and paperboard mills operating close to capacity is a question for the future to answer. It is believed that those plants now producing or which can produce what

1941 PAPER GRADES - BLEACHED SULPHITE PULP

(IN TONS OF 2,000 POUNDS)

CONSUMPTION 1,677,533	
CAPACITY 1,589,633	
PRODUCTION 1,468,533	
DOMESTIC SALES 571,406	
IMPORTS 267,000	
EXPORTS 76,000	

United States Pulp Producers Association

is needed in the War Program will keep running. Those that cannot produce anything for the war effort either directly or indirectly face the greatest uncertainty. To a degree their operation will depend upon in-

1941 UNBLEACHED SULPHITE PULP

(IN TONS OF 2,000 POUNDS)

CONSUMPTION 1,476,700
CAPACITY 1,359,600
PRODUCTION 1,193,700
DOMESTIC SALES 460,560
IMPORTS 351,000
EXPORTS 68,000

United States Pulp Producers Association

1941 TOTAL SULPHATE PULP

(IN TONS OF 2,000 POUNDS)

CONSUMPTION 4,428,460	PRODUCTION 4,387,837	UNBLEACHED 3,812,700 84%
BLEACHED 737,460 17%		
CAPACITY 4,537,700		
DOMESTIC SALES 335,358		
BLEACHED 73,358 22%	UNBLEACHED 262,000 77%	IMPORTS 176,000
EXPORTS 10,377	IMPORTS 176,000	EXPORTS 135,375
BLEACHED 10,377 8%	UNBLEACHED 125,000 92%	

United States Pulp Producers Association

1941 BLEACHED SULPHATE PULP

(IN TONS OF 2,000 POUNDS)

CONSUMPTION 737,460	CAPACITY 725,000
PRODUCTION 687,837	
DOMESTIC SALES 73,358	
IMPORTS 60,000	
EXPORTS 10,377	

* 180,000 Tons additional bleaching capacity utilized for Unbleached Sulphate
United States Pulp Producers Association

One Common Goal

★ ★ ★ ★ ★ ★ ★ ★ ★

As war conditions place an increasingly heavier strain on our Industrial Front, civilian curtailments and restrictions are inevitable.

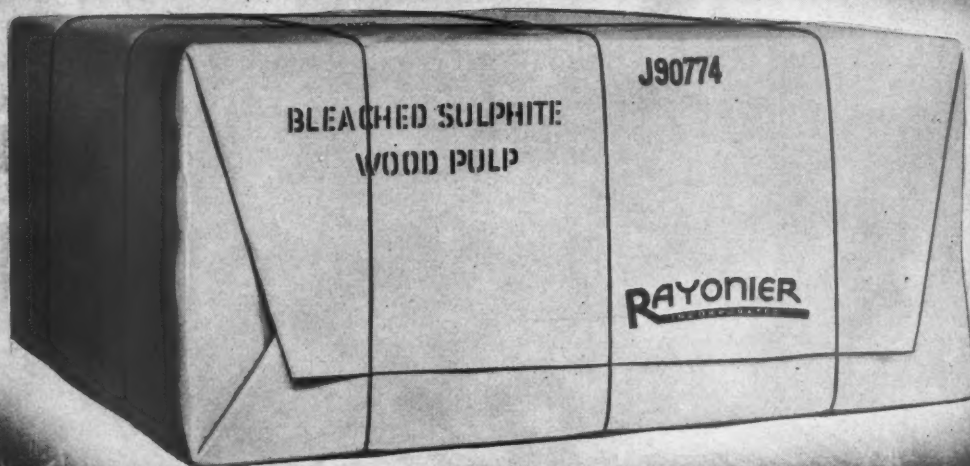
In the difficult days ahead it will be necessary for producers and consumers to bear in mind that no inconveniences or sacrifices are too great to achieve the one common goal — Victory.

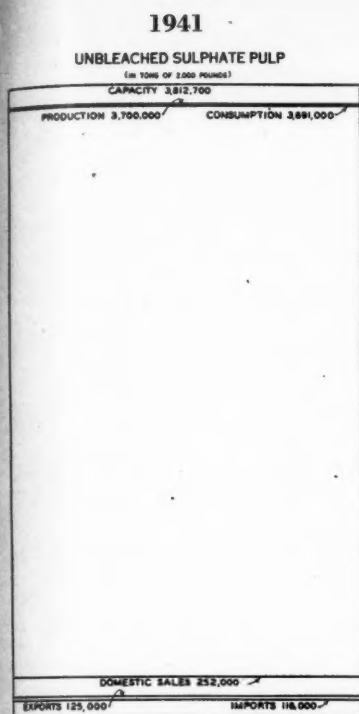
RAYONIER

Better Pulps for Better Performance

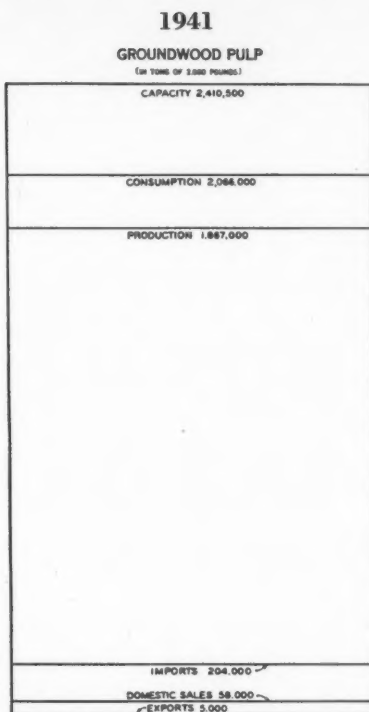
Mills: Hoquiam, Port Angeles, Shelton, Tacoma, Wash. and Fernandina, Fla. • Executive Offices: 343 Sansome Street, San Francisco • Sales: 122 East 42nd Street, New York

★ ★ ★ ★ ★ ★ ★ ★ ★





United States Pulp Producers Association



United States Pulp Producers Association



United States Pulp Producers Association

CONSUMPTION shown in the preceding graphs is the apparent consumption, based on production plus imports minus exports. Data covering stock decreases at paper and board mills and on docks during 1941 are incomplete. Following are estimates of the amounts of pulp used from stocks at pulp, paper and board mills and from the docks during 1941. Use of these estimates of stock decreases indicates estimated actual consumption of pulp in the United States during 1941, as follows:

genuity in managing without the use of scarce materials.

But which plants continue at capacity and which will curtail or close down for the war's duration will be determined finally by the War Production Board.

Allocation of wood pulp began toward the end of 1941 with the apportionment of nitrating pulp requirements for smokeless powder manufacturing among those plants equipped to produce it. Beginning May 1st all wood pulp was allocated by the WPB. Through this allocation the WPB controls the output of the pulp, paper and paperboard industry and can say what products are needed and what can be dispensed with until the war is won. As this is written the distribution of wood pulp existing prior to allocation has been but slightly changed. It is a foregone conclusion, however, that the WPB will so distribute the available supply as to fit the requirements of war. Part of the redistri-

	Pulp Used from Stocks during 1941	Estimated Actual con- sumption 1941
Bleached Sulphite	77,000	2,057,300
Unbleached "	67,000	1,543,700
Bleached Sulphate	17,000	754,460
Unbleached "	82,000	3,773,000
Soda	8,000	632,500
Semi-chemical	5,000	230,263
Total Chemical	256,000	8,991,223
Groundwood	11,000	2,077,000
Total	267,000	11,068,223

United States Pulp Producers Association.

PAPER . . . America's

6th Industry



RUSH! TARGET PAPER

(NEWS ITEM: *The War Department has this week included*
in its announcement of contracts \$79,904.00 for target paper.)

The Paper and Board Mills of the United States will supply 8 million tons of Paper products directly needed for the armed forces during 1942. This is approximately 40 per cent of the tonnage of an industry working at capacity.

Target paper for the practice range . . . condenser paper for electrical equipment . . . specialty papers for insulation . . . casings for shell containers . . . blueprint paper for the Navy and for defense plants . . . paperboard for packing shells, clothing and food—these and many other grades of paper are typical contributions of the Paper Industry to America's war effort.

With the Paper Industry running at capacity to achieve the record-breaking tonnage demanded by the Victory program, any further increase in production means modernization—the improvement of present equipment by installation of the latest developments in high-speed paper machines.

Consider the Puseyjones Flow-Spreader for improving the delivery of stock to the fourdrinier or cylinder wet end. With the Puseyjones Flow-Spreader, the entire flow comes from one pipe and is spread smoothly and evenly across the machine by a simple nozzle construction without use of multiple inlets, baffles and other flow distributing devices. Formation is improved. Production is increased.

Keeping paper production at the point of highest efficiency is not only essential to Victory, but also best for the tremendous competition coming after the present emergency is over.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery
Wilmington, Delaware, U. S. A.



Table 1.—Wood-Pulp Production, by Quantity and Value, by Process
for the United States: 1940, 1939, and 1938

[The value figures for 1938 are not strictly comparable with all items for later years ⁴]

	1940		1939		1938	
	Short tons	Value (f.o.b. mill)	Short tons	Value (f.o.b. mill)	Short tons	Value (f.o.b. mill)
Wood pulp, aggregate	8,851,740	\$295,524,079	6,993,334	\$209,061,107	5,933,560	\$180,394,204
Mechanical, total.....	1,762,821	32,753,955	1,444,875	27,710,170	1,333,308	24,507,924
Not steamed.....	1,593,317	29,884,215	1,342,643	25,379,398	1,264,544	23,273,725
Steamed.....	169,504	2,869,740	102,232	2,330,772	68,764	1,234,199
Sulphite fiber, total...	2,591,684	128,983,210	1,946,452	86,043,861	1,606,476	78,079,147
Unbleached.....	990,668	38,469,853	729,203	24,736,494	601,855	21,303,522
Bleached ¹	1,601,016	90,513,357	1,217,249	61,307,367	1,004,621	56,775,625
Sulphate fiber, total...	3,725,135	102,578,341	2,962,657	72,939,469	2,443,051	57,694,035
Unbleached.....	3,166,263	77,830,897	2,538,204	55,242,263	2,122,538	45,544,782
Bleached.....	558,872	24,747,444	424,453	17,697,206	320,513	12,149,253
Soda fiber, bleached and unbleached.....	548,047	27,939,508	2/441,565	2/19,710,156	2/395,307	2/18,062,562
Semichemical and other wood pulp.....	164,940	2,735,127	151,658	2,105,267	118,544	1,677,716
Screenings, mechanical and chemical ³	59,113	533,938	46,127	552,184	36,874	372,820

¹/ Includes data for "Superpurified" and "Rayon and special grades" to avoid disclosing figures for individual establishments for 1940. For 1939: "Superpurified" and "Rayon and special chemical grades," 193,420 tons, valued at \$12,567,963; "Other bleached," 1,023,829 tons, valued at \$48,739,404. For 1938: "Superpurified," 77,193 tons, valued at \$5,650,868; "Rayon and special chemical grades," 151,068 tons, valued at \$12,704,006; "Other bleached," 776,360 tons, valued at \$38,420,751.

²/ "Bleached" only.

³/ Combined to avoid disclosing figures for individual establishments.

⁴/ The questionnaires used in making the canvass for 1938 carried the following note: "Where pulp is consumed at mill and not sold, please state production cost or price charged to paper plant." The questionnaires used for the odd-numbered (biennial-census) and 1940, directed the manufacturers to report the estimated market value, f.o.b. mill. The value figures given for 1938 in Tables 1 and 3 are not, therefore, strictly comparable for all items.

Bureau of the Census.

Table 2.—Pulpwood Consumption and Wood-Pulp Production—Quantity, by Process of Manufacture,
for the United States: 1940, 1939, and 1938

	1940		1939		1938	
	Pulpwood consumption (Cords)	Wood-pulp production (Short tons)	Pulpwood consumption (Cords)	Wood-pulp production (Short tons)	Pulpwood consumption (Cords)	Wood-pulp production (Short tons)
Total.....	13,742,958	8,851,740	10,816,466	6,993,334	9,193,991	5,933,560
Mechanical.....	1,608,625	1,762,821	1,315,727	1,444,875	1,219,306	1,333,308
Sulphite.....	4,965,908	1/2,591,684	3,689,420	1,946,452	3,090,046	1,606,476
Sulphate.....	5,975,334	3,725,135	4,859,020	2,962,657	4,025,540	2,443,051
Soda.....	979,360	548,047	764,309	441,565	718,172	395,307
Semichemical and other wood pulp...	213,731	164,940	187,990	151,658	140,927	118,544
Screenings, mechani- cal and chemical ² /	-----	59,113	-----	46,127	-----	36,874

¹/ See Table 1, footnote 1.

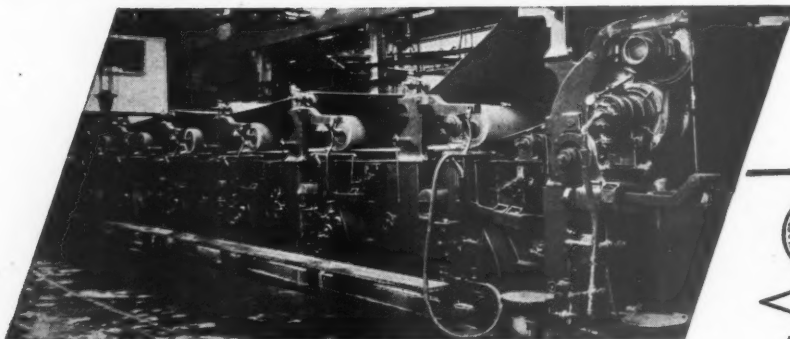
²/ Combined to avoid disclosing figures reported by individual establishments for 1940 and 1939. For 1938, mechanical, 4,215 tons; chemical, 32,659 tons.

Bureau of the Census.

DOWICIDE

INDUSTRIAL GERMICIDES AND FUNGICIDES

INCREASES FELT LIFE



DOWICIDE* G—used as a germicidal solution to wash felts during shut-downs—has proved an effective means of preserving and increasing felt life.

In mills where felts are subject to heavy manufacturing loads and where there are no shut-downs between felt changes, DOWICIDE G is being added to the system continuously. Felt life extension of from 50% to 200% has resulted when a concentration of 50 parts per million has been used.

The trade mark DOWICIDE designates a group of chlorinated phenols widely used in the paper field. For complete information write to the Dowicide Division.

**GREAT WESTERN DIVISION
THE DOW CHEMICAL COMPANY**

Main Office: San Francisco, Calif.
Branch Offices: Los Angeles • Seattle

*Trade Mark Reg. U. S. Pat. Off.

Use Dowicide

- To prevent stain and decay on pulp wood.
- To control slime conditions.
- To prolong felt life.
- For rot and termite-proofing.
- For mold-resistant paper products.
- To preserve proteins, starches and other coating materials.
- To reduce maintenance costs.

bution will come about without the action of the WPB through declining demand from the contracting civilian economy.

Simplification of grades and reduction in weights will play an im-

portant part, too. This program, generally welcomed as needed, is just now well under way. Prices of pulp, of paper and of board, are under control by the Office of Price Administration. Gradually govern-

ment control of the industry is becoming complete. The enormous demands of war have brought this about.

But complete governmental control of an industry does not solve the government's problems in war time as far as that industry is concerned. Control, in itself, does not insure the maximum production of the products needed in the prosecution of the war. Government must have, in addition, the full cooperation of the men and women in the industry right down the line. The democratic spirit of voluntary cooperation toward a common goal must be maintained even under complete governmental control in order to achieve the maximum of production in quality and quantity.

The pulp, paper and paperboard industry is giving its full voluntary cooperation to our government toward winning the war. Whatever the Army, Navy or war industries may want from the mills, they will receive with an encouraging smile no matter what the cost in effort. This desire to do everything to help win the war, to work with the controls that have been applied, has been encouraged by the cooperative attitude of the Pulp and Paper

Table 3.—Wood-Pulp Production—Average Value Per Ton, for the United States: 1940, 1939, and 1938

[The figures for 1938 are not strictly comparable with all items for later years (see 4/ under Table 1)]

	1940	1939	1938
Mechanical:			
Not steamed	\$18.75	\$18.90	\$18.40
Steamed.....	16.93	22.80	17.95
Sulphite:			
Unbleached.....	38.83	33.92	35.40
Bleached.....	56.53	50.37	56.51
Sulphate:			
Unbleached.....	24.58	21.76	21.45
Bleached.....	44.28	41.69	37.91
Soda, bleached and unbleached.....	50.98	1/44.64	1/45.69
Semichemical and other wood pulp.....	16.58	13.88	14.15

1/ "Bleached" only.

Table 4.—Pulpwood Consumption, by Quantity and Cost, and by Kind of Wood: 1940, 1939, and 1938

Kind of wood	1940		1939		1938	
	Cords	Cost	Cords	Cost	Cords	Cost
Total.....	13,742,958	\$109,739,958	10,816,466	\$84,538,835	9,193,991	\$74,433,181
Yellow pine, Southern....	5,013,478	27,557,380	3,834,644	20,126,230	3,261,404	17,570,346
Spruce:						
Domestic.....	2,045,519	24,226,288	1,567,643	18,419,481	1,447,457	17,249,767
Imported.....	963,195	13,614,573	906,806	12,575,102	832,295	11,822,410
Hemlock:						
Domestic.....	2,636,118	19,217,536	2,218,678	15,147,529	1,677,181	11,124,455
Imported.....	152,653	1,100,322	1/15,147,529	37,243	212,852	
Poplar:						
Domestic.....	489,866	4,299,280	354,125	3,179,101	324,868	2,947,023
Imported.....	108,809	1,232,819	123,148	1,461,648	95,758	1,111,224
Jack pine:						
Domestic.....	415,202	3,672,294	359,755	3,355,291	258,570	2,460,539
Imported.....	62,773	638,645	1/3,355,291	1/2,460,539		
Balsam fir:						
Domestic.....	388,577	4,067,521	283,506	2,891,304	321,984	3,446,131
Imported.....	83,609	1,043,995	74,705	891,287	65,392	731,128
Beech, birch, and maple, domestic and imported..	298,895	2,939,849	241,039	2,318,285	168,796	1,667,233
White fir, domestic and imported.....	213,445	1,568,522	2/159,428	2/953,343	2/98,878	2/608,238
Cottonwood.....	74,584	512,064	64,330	428,119	40,996	257,069
Tamarack (larch).....	11,324	85,222	8,450	64,620	9,937	80,735
Other woods^{3/}.....	509,976	3,059,404	301,195	2,026,107	322,072	2,330,742
Slabs and mill waste.....	274,935	903,744	319,014	701,388	231,160	813,289

1/ Combined to avoid disclosing data for individual establishments.

2/ Domestic only.

3/ For 1940, domestic chestnut, Douglas fir, yellow poplar, oak, tupelo (and black gum), red gum, willow, and domestic and imported miscellaneous hardwoods not reported separately. For 1939 and 1938, see published reports.

Bureau of the Census.

Quality Sulphite Pulp



DOMESTIC
and
EXPORT
SHIPMENTS

Annual Capacity 175,000 Tons

PUGET SOUND PULP & TIMBER CO
Bellingham Washington

Table 5.—Pulpwood Consumption, by Quantity and Cost, for the United States: 1940, 1939, and 1938

Year	Number of cords	Cost (f.o.b. mill)	Average per cord
1940..	13,742,958	\$109,739,958	\$7.99
1939..	10,816,466	84,538,835	7.82
1938..	9,193,991	74,433,181	8.10

Table 7.—Production Capacity Per 24 hours: 1940

Kind of pulp made	Production capacity, unbleached (Short tons)	Bleaching capacity (Short tons)
Mechanical.....	7,251	-----
Soda.....	1,922	1,910
Sulphite: Superpurified.....	-----	307
Rayon and special chemical grades.	-----	1,045
Other.....	8,464	4,657
Sulphate.....	11,853	2,053
Semichemical.....	592	-----

1/ The amount of daily production (total of all grades) which can be prepared for shipment by lapping is 5,808 tons, and by drying, 7,007 tons.

Bureau of the Census.

Sulphur Available for Building Mill Reserves

● The American sulphur industry finds itself well able to cooperate with industrial users of sulphur who recently were advised by the War Production Board to build up stocks of sulphur at their plants so that possible future transportation tie-ups would not halt their operations. All sulphur production and shipment records were broken in 1941 and stocks at the mines decreased about 7%. The sulphur industry, however, during the first three months of this year, was able to exceed by about 8% the 1941 rate of production and increase by about 20% the rate established during the first quarter of 1941. As a result, stocks of sulphur at the mines on March 31 of this year were slightly in excess of the stocks at the end of 1941 in spite of the present accelerated demand and shipments. Producers of sulphur, therefore, have available ample stocks from which consumers may build up their reserves during the summer and so relieve the strain on the railroads during the fall and winter.

Year—	Domestic Bleached Sulphite	Foreign Bleached Sulphite	Foreign Strong Sulphite	Swedish Kraft	Domestic Bleached Soda
1928	\$80	\$68 — \$78	\$48—\$55	\$50 — \$55	-----
1929	75— 80	68 — 77	50— 56	47 — 50	-----
1930	65— 75	57 — 68	42— 56	30 — 47	-----
1931	45— 65	43 — 57	32— 43	28 — 31	-----
1932	35— 45	35 — 43	27— 32	25 — 30	-----
1933	35— 60	35 — 57	27— 43	25 — 37	\$40—\$50
1934	55— 60	55 —	42—	33 — 38	50
1935	50— 55	50 — 55	37— 42	33 — 36	50
1936	50— 53	50 — 65	38— 50	36 — 50	50— 54
1937	54— 70	65 — 95	50— 75	47 — 76	54— 65
1938	60— 50	90 — 50	70— 36.50	47.50— 31.50	58— 51
1939	50	47.50— 60	36— 50	-----	-----
1940*	60— 72.50	60 — 82.50	50— 72.50	42.50— 72.50	58— 66
1941**	72.50	82.50— 85	67.50— 75	72.50— 77.50	66

Monthly price movement, 1941—

	Domestic Bleached Sulphite	Foreign Bleached Sulphite	Foreign Strong Sulphite	Swedish Kraft	Domestic Bleached Soda
January	\$72.50	\$82.50—	\$67.50—	\$72.50—	\$66
February	72.50	82.50—	67.50—	72.50—	66
March	72.50	82.50—	67.50—	72.50—	66
April	72.50	82.50—	67.50—	72.50—	66
May	72.50	82.50—	67.50—	72.50— 77.50	66
June	72.50	82.50—	67.50—	77.50—	66
July	72.50	82.50— 85	67.50— 72.50	77.50—	66
August	72.50	-----	72.50— 75	-----	66
September	72.50	-----	75 —	-----	66
October	72.50	-----	-----	-----	66
November	72.50	-----	-----	-----	66
December	72.50	-----	-----	-----	66

*The price of domestic unbleached sulphite was \$50 per short ton ex dock Atlantic seaboard during the first quarter, \$52.50 during the second quarter and \$63.50 per ton during the third and fourth quarters.

**The price of domestic unbleached sulphite was 63.50 per ton ex dock Atlantic seaboard during the entire year.

Foreign pulp prices quoted were for small remaining stocks available for sale or resale.

CANADA PULP PRODUCTION

(Tons of 2,000 lbs.)

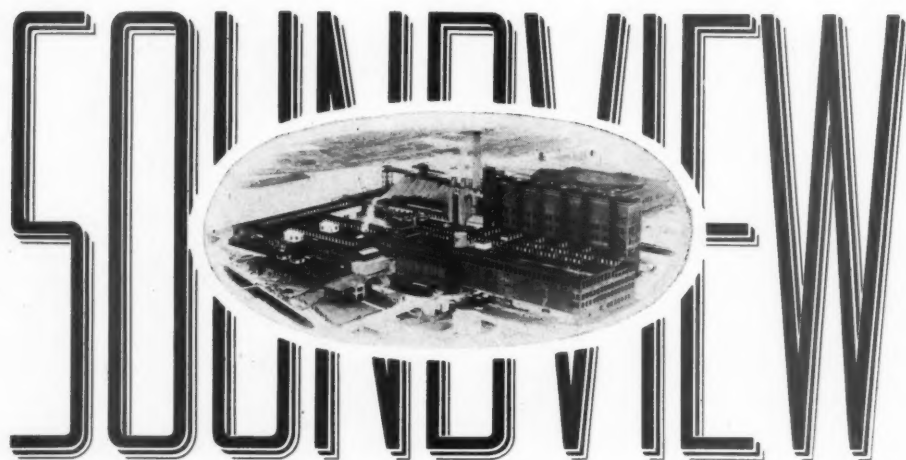
	Mechanical Tons	Sulphite Tons	Sulphate ¹ Tons	Total Tons
1920	1,090,114	654,273	188,487	1,922,774
1921	931,560	476,929	131,337	1,539,826
1922	1,241,185	678,878	217,862	2,137,925
1923	1,449,106	749,668	224,812	2,413,586
1924	1,427,782	768,035	218,207	2,414,024
1925	1,621,917	842,785	242,207	2,706,909
1926	1,901,268	995,203	256,074	3,152,545
1927	1,922,124	1,016,060	262,512	3,200,696
1928	2,127,699	1,117,227	256,969	3,501,895
1929	2,420,774	1,236,232	250,104	3,907,110
1930	2,283,130	1,076,804	188,253	3,548,187
1931	2,016,480	941,586	145,156	3,103,222
1932	1,696,021	941,579	144,367	2,781,967
1933	1,859,049	937,313	182,988	2,979,350
1934	2,340,441	1,020,493	205,980	3,566,914
1935	2,458,000	1,025,000	206,000	3,689,000
1936	2,910,338	1,168,927	273,494	4,352,759
1937	3,308,517	1,373,232	312,741	4,994,490
1938	2,650,000	925,000	258,000	3,833,000
1939	2,738,011	1,028,820	313,628	4,080,459
1940	3,305,484	1,480,545	399,267	5,290,762
1941*	3,500,000	1,525,000	410,000	5,435,000

¹Prior to 1939 the sulphate totals included sulphate pulps only. 1939, 1940 and 1941 sulphate totals include soda and other pulp, according to the Dominion Bureau of Statistics.

*Estimated by Canadian Pulp & Paper Association.

WOOD PULP PRICES IN U. S.

Annual Capacity
Approximately 175,000 Tons



High Grade
**BLEACHED
SULPHITE PULP**

SOUNDVIEW PULP COMPANY
EVERETT · WASHINGTON



Branch of the WPB and the OPA in working constructively with the industry's several advisory committees.

Appreciation for Foresight

● The industry's important contributions to the War Program are not the result of only a few months of effort. The basis for the industry's aid was laid during the past two decades when in the face of duty free currency manipulated wood pulp imports private enterprise built up a continental wood pulp industry, which, while not large enough to replace all imports, was in a sufficiently strong position to step into the emergency and provide the pulp that is so badly needed to prosecute the war.

In the 1941 REVIEW NUMBER it was stated, "Because courageous men planted the seed and nurtured it through years of storm and drought to today's needed harvest, the WESTERN HEMISPHERE HAS ITS OWN WOOD PULP SUPPLY, as essential to defense as wheat."

The substitution of the word,

"WAR" for "DEFENSE" adds its own emphasis to the importance of the work of the men who built up a continental pulp industry. This was individual planning contrasted with government policy which discouraged the expansion of the American industry by allowing duty free pulp from depreciated currency, low wage countries to enter the country without restriction. At one time a high government official said over-expansion was the industry's trouble and not low priced imports. Had it not been for that "over-expansion" the industry would not be in a position to make its very vital contributions toward winning the war through wood pulp for:

1. Smokeless powder
2. Paper and paperboard
3. Rayon
4. Plastics
5. Lease-Lend to Great Britain
6. Exports to South America

In the midst of war it is well to recall that American individual initiative made these contributions possible.

We Need a Forest Policy

● In the 1941 REVIEW NUMBER it was pointed out that the tight pulp situation was due to the lack of a national forest policy (Page 5, May, 1941). The intervening year has shown the need is more imperative than ever, but its shaping is neglected for the immediate pressing war problems. The report of the Joint Congressional Committee on Forestry made in March, 1941, has apparently been shelved. Most of its recommendations, if adopted, would aid in protecting our forest industries after the war is over. But one, the recommendation to increase appropriations for fire protection, is of pressing importance to the Pacific Coast. That this problem is not recognized the country over is shown by the recent difficulty experienced by Pacific Coast senators and representatives in obtaining additional funds for forest fire protection in the Pacific Northwest this summer.

Table 6.---Pulpwood Consumption, by Quantity and Cost, and Wood-Pulp Production, by Quantity and Value, by States: 1940

[This table shows statistics by States that can be given without disclosing data for individual establishments]

State	Wood Consumed		Pulp Produced	
	Cords	Cost	Short tons	Value
United States.....	13,742,958	\$109,739,958	8,851,740	\$295,524,079
Northeastern and Central States ^{1/} , total	3,199,413	37,721,223	2,260,100	85,818,739
Maine.....	1,386,878	15,259,632	1,080,818	31,981,027
New York.....	677,995	9,834,411	526,367	19,122,348
Pennsylvania.....	386,710	5,171,386	231,536	11,433,940
Vermont.....	18,854	218,727	19,137	520,758
Other Northeastern and Central States ^{2/}	728,976	7,237,067	402,242	22,760,666
Lake States, total.....	1,866,248	20,096,151	1,189,541	43,199,362
Michigan.....	313,038	3,270,428	212,850	7,451,363
Minnesota.....	349,421	3,240,229	247,076	7,243,658
Wisconsin.....	1,203,789	13,585,494	729,615	28,504,341
Southern States ^{3/} , total.....	5,607,831	31,016,404	3,562,836	99,267,020
Alabama.....	387,237	2,021,988	246,964	5,690,637
Florida.....	936,112	4,909,843	583,294	17,002,536
Louisiana.....	1,313,343	7,014,615	864,552	20,134,263
North Carolina.....	542,281	3,357,954	294,130	11,872,225
Virginia.....	774,260	4,789,955	496,918	15,276,672
Other Southern States ^{4/}	1,654,598	8,922,049	1,076,978	29,290,687
North Pacific States, total.....	3,069,466	20,906,180	1,839,263	67,238,958
Oregon.....	579,804	3,852,959	396,142	9,155,646
Washington.....	2,489,662	17,053,221	1,443,121	58,083,312

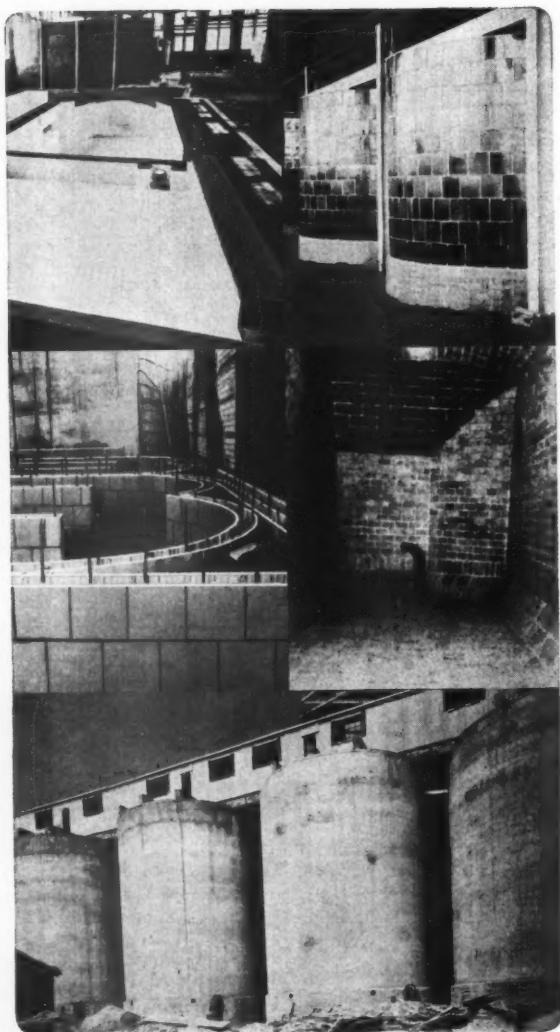
^{1/} Including Tennessee.

^{2/} Maryland, Massachusetts, New Hampshire, Ohio, Tennessee.

^{3/} Not including Tennessee.

^{4/} Arkansas, Georgia, Mississippi, South Carolina, Texas.

Bureau of the Census.

STEBBINS*Quality***LININGS
&
TILE TANKS**

... provide Paper Mills wherever acids, alkalis, corrosive or non-corrosive liquids, gases or vapors are encountered, with an efficient, economical, long-lived and trouble-free installation.

Where sludges, brines, bleaching solutions, process water, pulps, dust, salts, granular products, etc., are to be stored, the new STEBBINS tile tank can be installed without waiting.

Fifty-eight years' experience in meeting specific operating conditions in a great many processes has provided STEBBINS with one ingredient that is vital today—KNOWLEDGE.

To know how to do a first-class job—saves TIME. Ask STEBBINS when you have a lining or tank problem.

SEMCO

Stebbins Engineering Corporation

TEXTILE TOWER

SEATTLE, WASHINGTON

REGIONAL PERCENTAGES OF UNITED STATES WOOD PULP PRODUCTION

Total and by Grades in 1939, 1940 and 1941

Region	Sulphite			Sulphate			Groundwood			Soda			Total		
	1939	1940	1941	1939	1940	1941	1939	1940	1941	1939	1940	1941	1939	1940	1941
New England	22.1	21	22	*	*	.5	36.9	33	35	23.6	22	22.5	13.6	14.5	14.5
Middle Atlantic	9	9	9	—	*		16.8	14	16.5	33.8	34	34	8.1	8	8
Lake States	27.3	23	24	7.7	7.5	7	22.9	19	22	9.6	13	11.5	16.2	14.5	14.5
South	1.7	4.5	4	82.3	83	82.5	5.2	17	9	28.3	31	32	41.1	43	43
West Coast	39.5	42.5	41	9.8	9.5	10	18	17	17.5	4.5	*	*	19.4	20	20
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

1939: As reported to United States Pulp Producers Association by 91 per cent of the industry and estimated for the remaining 9 per cent.

1940: As reported to United States Pulp Producers Association by 90 per cent of the industry and estimated for the remaining 10 per cent.

1941: Estimated for 100 per cent of the industry by United States Pulp Producers Association.

*Included in Lake States' total so as not to disclose individual mills' figures.

Source: United States Pulp Producers Association.

UNITED STATES

WOOD PULP PRODUCING CAPACITY BY REGIONS

1941

(In tons of 2,000 pounds)

Grade—	New England	Middle Atlantic	Lake States	Pacific	South	Total
Sulphite—						
Bleached*	423,100	104,500	507,300	635,400	134,000	1,804,400*
Unbleached	281,400	188,900	231,600	631,700	0	1,333,600
Total	704,500	293,400	738,900	1,267,200	134,000	3,138,000
Sulphate—						
Bleached*	0	0	79,000	101,000	545,000	725,000*
Unbleached	26,000	5,000	260,000	343,300	3,177,500	3,812,700
Total	26,000	5,000	339,900	444,300	3,722,500	4,537,700
Soda	143,310	239,430	54,480	20,000	212,780	670,000
Semi-chemical	0	5,000	1,700	43,200	170,100	220,000
Groundwood	804,500	467,500	539,600	385,200	213,700	2,410,500
TOTAL	1,678,310	1,010,330	1,674,580	2,159,900	4,453,080	10,976,200

UNITED STATES

WOOD PULP PRODUCING CAPACITY BY REGIONS

1942

(In tons of 2,000 pounds)

Grade—	New England	Middle Atlantic	Lake States	Pacific	South	Total
Sulphite—						
Bleached*	423,100	104,500	510,600	637,400	134,000	1,809,600*
Unbleached	283,720	188,900	245,350	661,580	0	1,379,550
Total	706,820	293,400	755,950	1,298,980	134,000	3,189,150
Sulphate—						
Bleached*	0	0	61,200	99,500	594,600	755,300*
Unbleached	26,000	8,000	274,350	358,655	3,503,295	4,170,300
Total	26,000	8,000	335,550	458,155	4,097,895	4,925,600
Soda	144,610	238,230	54,480	20,000	212,780	670,100
Semi-chemical	0	5,000	1,700	43,200	186,700	236,600
Groundwood	804,500	471,950	554,100	385,200	213,700	2,429,450
TOTAL	1,681,930	1,016,580	1,701,780	2,205,535	4,845,075	11,450,900

*The bleached capacity as shown above is that which was utilized by the companies during 1941 and estimated to be utilized during 1942. In addition to the bleached capacity utilized during 1941, the mills had facilities for bleaching 199,500 tons more of sulphite and 160,000 tons more of sulphate, which capacity was used during 1941 to produce unbleached grades.

Source: Based on reports to the United States Pulp Producers Association by mills representing 96 per cent of the industry's productive capacity and estimated for the remaining 4 per cent. These reports gave each company's estimate of its potential annual capacity, based on the daily rated capacity multiplied by the number of days each company estimated its pulp mills could operate during the year. In computing the capacity for the years 1941 and 1942, new or additional capacity has been included for that period of the year after the announced date for completed installation of such additional equipment.



INLAND EMPIRE • PAPER • COMPANY

Mills at

MILLWOOD, WASHINGTON

☆ *Seven Miles East of Spokane*

Manufacturers of
BONDS, BOOKS
BUILDING PAPERS
CARBONIZING
CATALOG PRINT
COLORED POSTERS
DRAWING
ENVELOPE
HALFTONE NEWS
LEDGERS
MAGAZINE PRINT
MIMEOGRAPH
NEWSPRINT
SALESBOOK
WRAPPINGS

UNITED STATES WOOD PULP PRODUCTION, CONSUMPTION, IMPORTS, EXPORTS 1941

(In tons of 2,000 pounds)

Grade—	Consumption ¹	Production ²	Imports ²	Exports ²
Sulphite:				
Bleached	1,980,300	1,703,300	389,000	112,000
Unbleached	1,476,700	1,193,700	351,000	68,000
Total	3,457,000	2,897,000	740,000	180,000
Sulphate:				
Bleached	737,460	687,837	60,000	10,377
Unbleached	3,691,000	3,700,000	116,000	125,000
Total	4,428,460	4,387,837	176,000	135,377
Soda	624,500	609,300	17,000	1,800
Special and Off Quality				
Groundwood	2,066,000	1,867,000	204,000	5,000
TOTAL	10,575,960	9,761,137	1,137,000	322,177

Source: United States Pulp Producers Association.

¹Estimated on the basis that consumption equals production and imports, minus exports.

²Estimated for 100 per cent of the industry by the United States Pulp Producers Association.

Imports and exports estimated for 1941 by United States Pulp Producers Association as figures for the entire year were not available from the U.S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

UNITED STATES WOOD PULP PRODUCTION, CONSUMPTION, IMPORTS, EXPORTS 1940

(In tons of 2,000 pounds)

Grade—	Consumption ¹	Production ²	Imports	Exports
Sulphite:				
Bleached	1,746,459	1,601,016	352,916	218,457
Unbleached	1,285,623	990,668	*380,913	72,290
Total	3,032,082	2,591,684	733,829	290,747
Sulphate:				
Bleached	619,682	558,872	84,887	18,205
Unbleached	3,237,009	3,166,263	223,577	157,568
Total	3,856,691	3,725,135	308,464	175,773
Soda	542,757	548,047	10,763	10,006
Special and Off Quality	165,063	164,940	63	
Groundwood	2,130,747	1,762,821	171,513	1,766
TOTAL	9,727,340	8,851,740	1,224,632	478,229

Source: United States Pulp Producers Association.

¹Estimated on the basis that consumption equals production and imports, minus exports.

²Data from U. S. Census.

Import and Export data from the Bureau of Foreign & Domestic Commerce.

*Includes 5,913 tons of sulphite screenings.

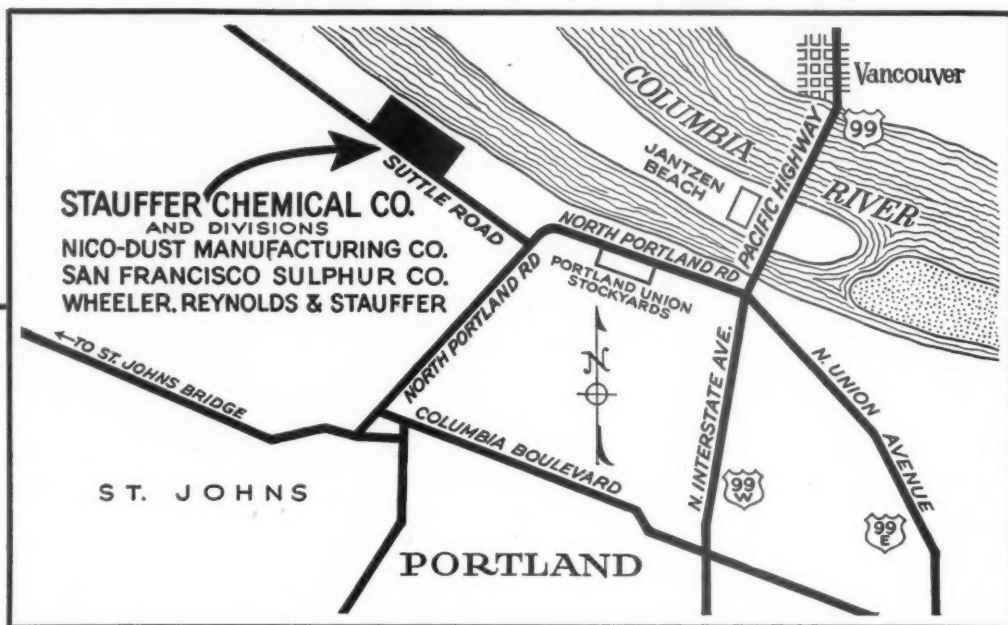
PACIFIC COAST STATES and British Columbia Paper and Paperboard Production

(Tons 2,000 lbs.)

State—	1935	1936	1937	1938	1939	1940	1941
Washington	465,708	506,579	546,227	472,185	552,577	600,180	716,614†
Oregon	242,085	262,478	273,630	234,879	260,402	310,870	371,179†
California	221,763	265,662	278,650	242,533	294,846	329,082	392,924†
British Columbia	299,816	320,555	320,920	222,305	272,117	330,572	351,453
Total Coast Production	1,229,372	1,355,274	1,419,427	1,171,902	1,379,942	1,591,585	1,832,170

Bureau of the Census, Dept. of Commerce. British Columbia figures from the Dept. of Lands, Forest Branch.

†1941 Washington, Oregon and California production estimated on basis of national average increase from 1940 production.




A NEW NEIGHBOR

... Bringing to the Northwest years of experience in the production of Industrial and Agricultural Chemicals.

For the Pulp and Paper Industry, LIQUID SULPHATE OF ALUMINA is now produced in NORTH PORTLAND and delivered in our fleet of rubber lined tank trucks.

If you are using solid alum our technical staff would welcome an opportunity to tell you about our liquid alum and the saving that can be made by using this modern product.



ANCHOR BRAND

PAPERMAKERS'

SULPHATE OF ALUMINA

STAUFFER CHEMICAL CO.

624-636 CALIFORNIA STREET
SAN FRANCISCO, CALIF.

AND NOW NORTH PORTLAND!

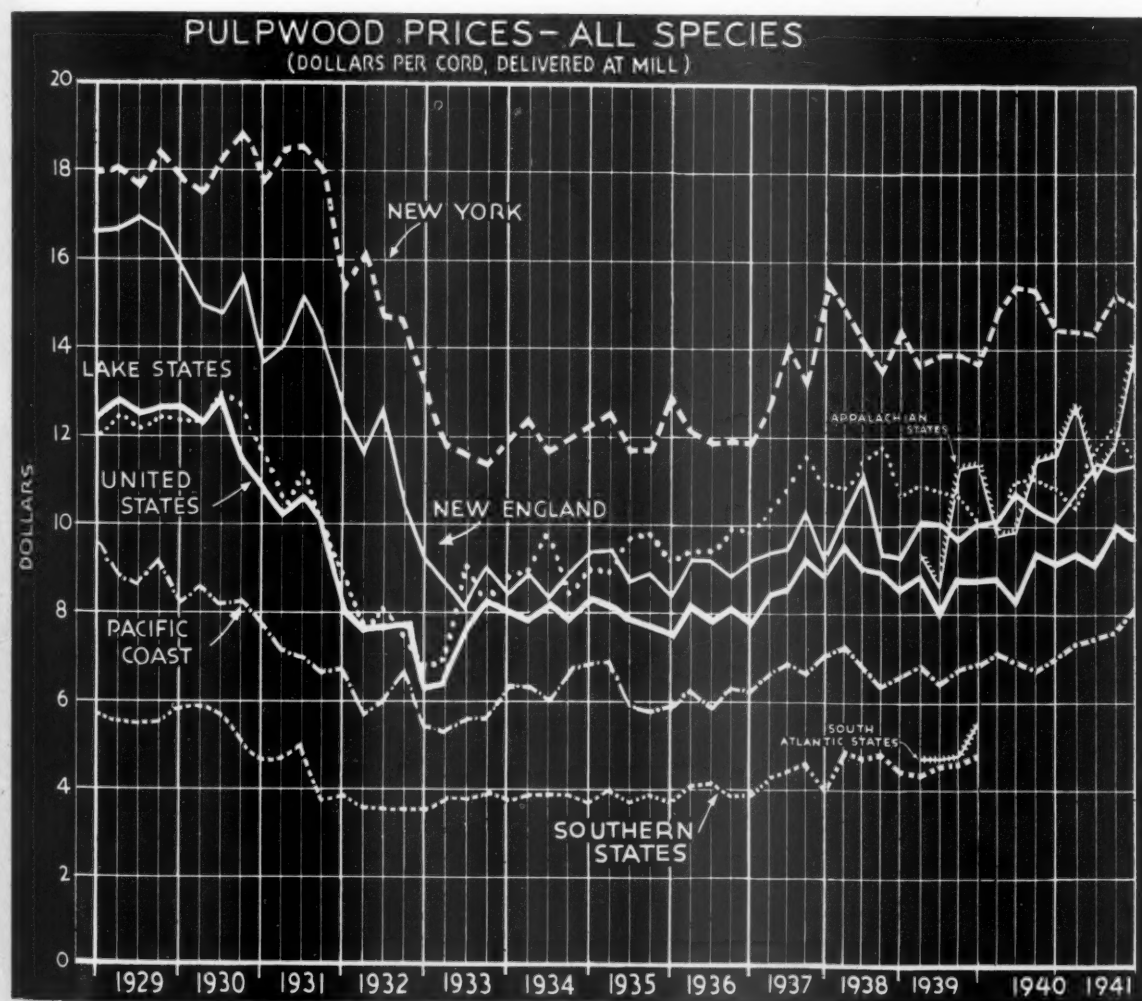
STOCKS OF WOOD PULP OF OWN PRODUCTION

Held by United States Wood Pulp Producers

(Does not include purchased pulp)

	January 1, 1941		December 31, 1941	
	For Own Use	For Market	For Own Use	For Market
Total All Grades	128,342	60,124	78,344	18,228
Total Sulphite	24,607	58,154	18,730	17,334
Total Bleached Sulphite	9,687	39,894	8,280	13,332
Rayon & Special	0	15,391	29	4,376
Other	9,687	24,503	8,251	8,956
Total Unbleached Sulphite	14,920	18,260	10,450	4,002
Total Bleached Sulphate	3,933	319	4,378	0
Total Unbleached Sulphate	42,906	1,109	9,383	170
Total Soda	8,460	0	3,357	0
Semi-Chemical	4	0	83	0
Chemical Screenings	639	171	663	29
Groundwood	47,346	371	41,500	695
Groundwood Screenings	447	0	250	0

Source: As reported to the United States Pulp Producers Association by 98 per cent of the Industry and estimated for remaining 2 per cent.



Data from American Paper & Pulp Assn.

"NON-USERS
ARE THE
LOSERS"

PROFIT PRODUCERS

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LONGER LASTING FELTS

Rubber is not the only basic material now being rigidly restricted. And whereas a motorist can make tires last longer by speed reduction, the producers of paper and board are called upon to run their machines faster, and produce greater tonnage.

NOW, more than ever, TENAX FELTS are proving their Tenacity and True Value.

*"Non-Users Are
the Losers"*

▼

LOCKPORT FELT COMPANY

Newfane, N. Y. • U. S. A.

Pacific Coast Representative: ALAN C. DUNHAM, Portland, Ore.

PULPWOOD PRICES F. O. B. MILL BY REGIONS

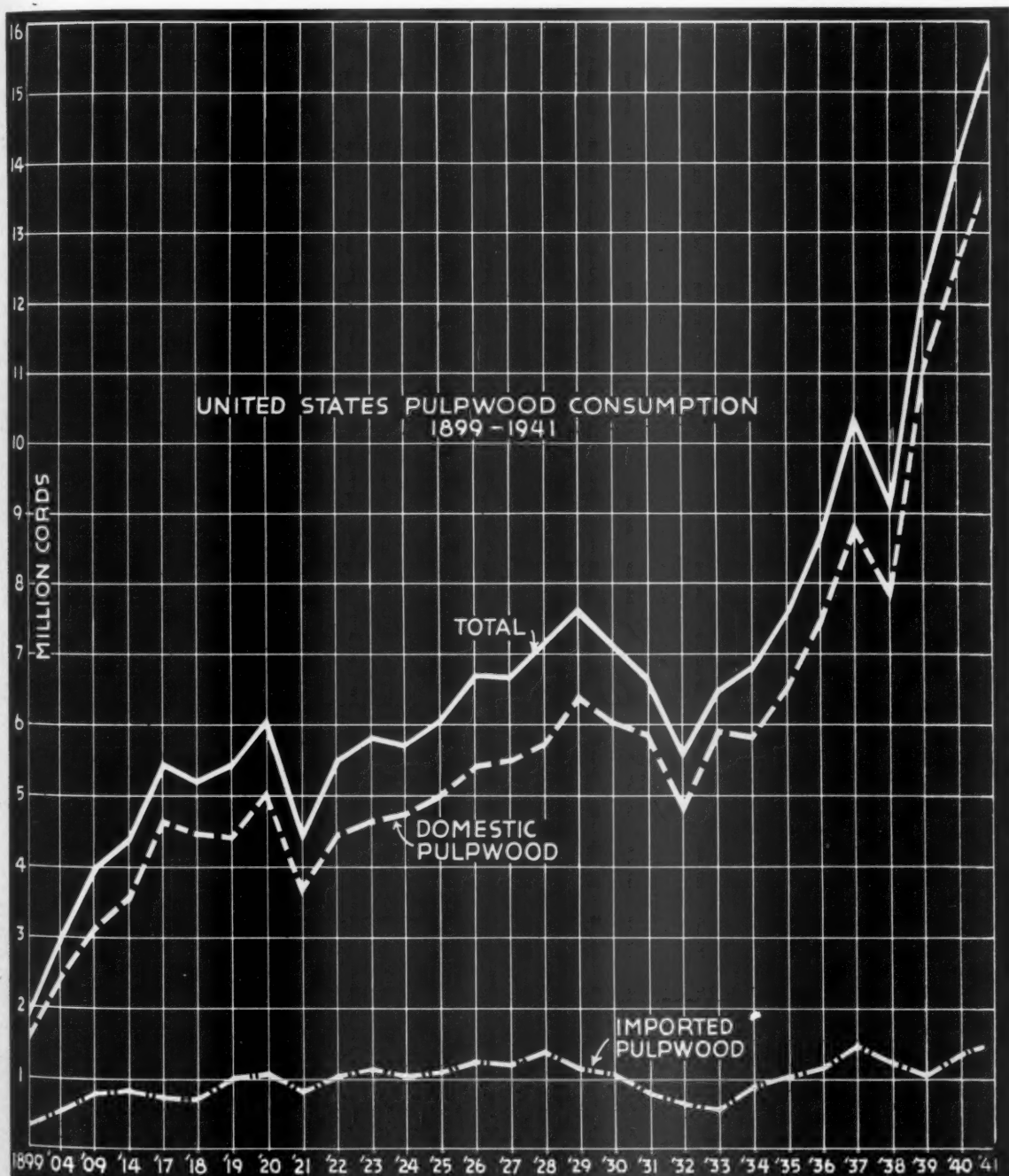
ALL SPECIES

(Dollars per Cord of 128 Cubic Feet)

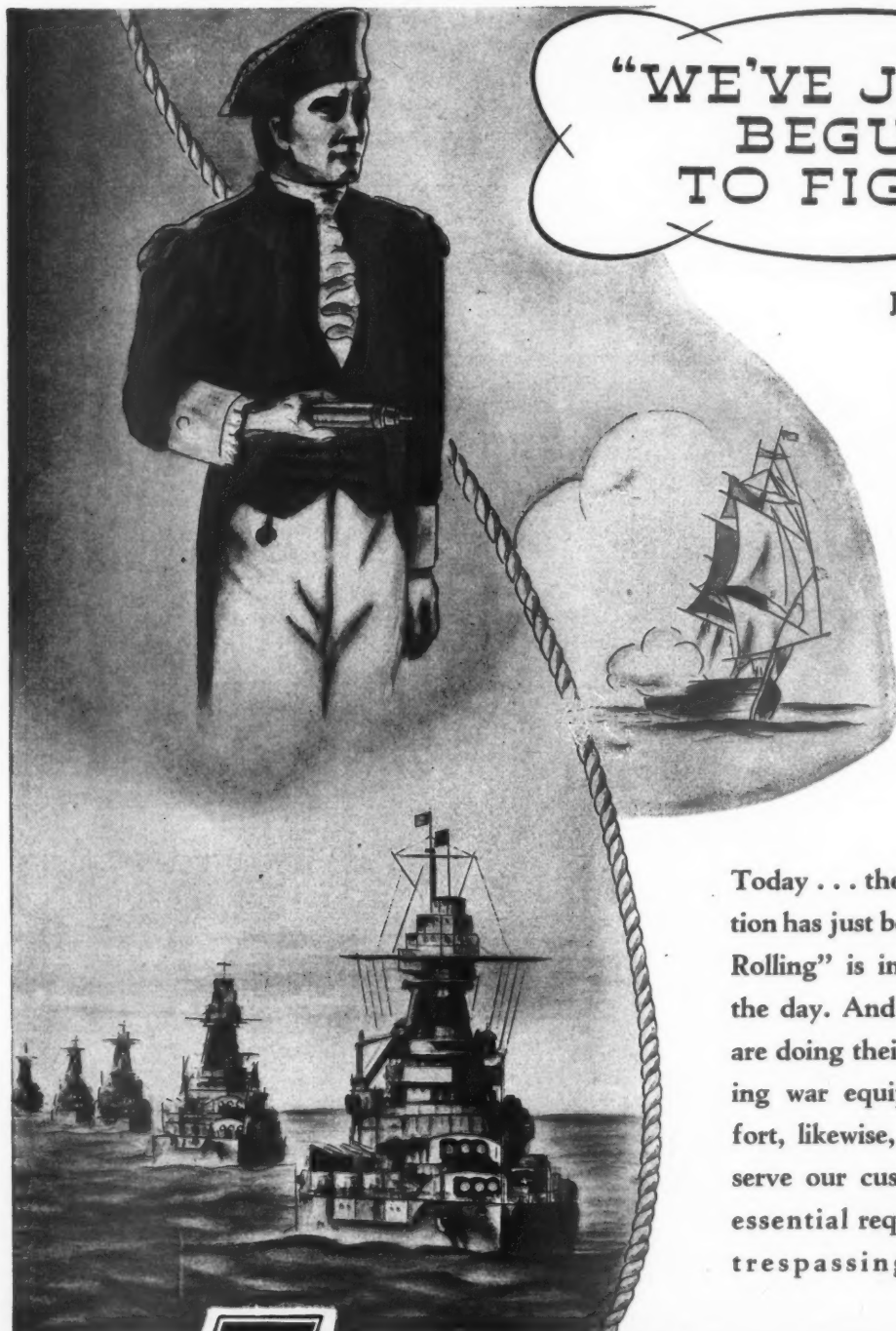
1941

Quarter	U. S. Total	New England	New York	Lake States	Appalachian States	Pacific Coast
1st	\$9.50	\$10.66	\$14.54	\$10.48	\$12.98	\$7.34
2nd	9.11	11.36	14.48	11.68	11.17	7.45
3rd	10.05	11.31	15.46	12.29	11.84	7.66
4th	9.94	11.36	15.05	11.54	14.25	8.20

Source: American Paper and Pulp Association.
Data covering Atlantic and Southern States included under U. S. Total.



Data from American Paper & Pulp Assn.



"WE'VE JUST
BEGUN
TO FIGHT"

JOHN PAUL JONES

Founder of the U. S. Navy . . . a seaman of great bravery and technical ability . . . his exploits on the sea were daring, courageous and successful.

Today . . . the battle of production has just begun. "Keep them Rolling" is industry's order of the day. And Jones' craftsmen are doing their share in producing war equipment. Every effort, likewise, is being made to serve our customers with their essential requirements without trespassing on war needs.

Jones

E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills

PACIFIC COAST PULP PRODUCTION — 1928-1941

Pacific Coast States and British Columbia
(Tons of 2,000 lbs.)

	1928 Tons	1929 Tons	1930 Tons	1931 Tons	1932 Tons	1933 Tons	1934 Tons
Washington	349,107	523,948	566,137	580,016	420,529	583,770	709,380
Oregon and California	213,407	256,546	248,952	237,532	187,133	189,332	240,167
British Columbia	310,961	304,619	335,429	310,029	259,586	343,897	383,818
Total Pacific Coast	873,475	1,085,113	1,150,518	1,127,577	867,248	1,117,999	1,333,365

	1935 Tons	1936 Tons	1937 Tons	1938 Tons	1939 Tons	1940 Tons	1941† Tons
Washington	775,722	895,797	1,184,390	836,959	1,107,318	1,443,121	1,475,671
Oregon and California	262,221	302,634	338,802	250,788	270,829	396,142	518,479
British Columbia	377,522	416,433	425,558	242,020	321,132	445,564	494,811
Total Pacific Coast	1,415,465	1,614,864	1,948,750	1,329,767	1,699,279	2,284,827	2,488,861

Source—U. S. figures up to and including 1940, from U. S. Dept. of Commerce, Bureau of Census; B. C. figures from Dept. of Lands, Forest Branch; and Dominion Bureau of Statistics.

† Figures based upon United States Pulp Producers Association total for Oregon and Washington. Division of production between Oregon and Washington estimated by Pacific Pulp & Paper Industry. No wood pulp production in California.

PULP WOOD CONSUMPTION — 1928-1941

Pacific Coast States and British Columbia

	1928 Cords	1929 Cords	1930 Cords	1931 Cords	1932 Cords	1933 Cords	1934 Cords
Washington	651,657	956,132	1,000,001	1,025,878	688,326	1,094,852	1,203,518
Oregon and California	308,264	340,745	351,053	319,876	265,470	241,841	322,287
British Columbia*	383,008	352,444	373,397	363,688	304,185	375,450	428,287
Total Pacific Coast	1,342,929	1,649,321	1,724,451	1,709,442	1,257,981	1,712,143	1,954,092

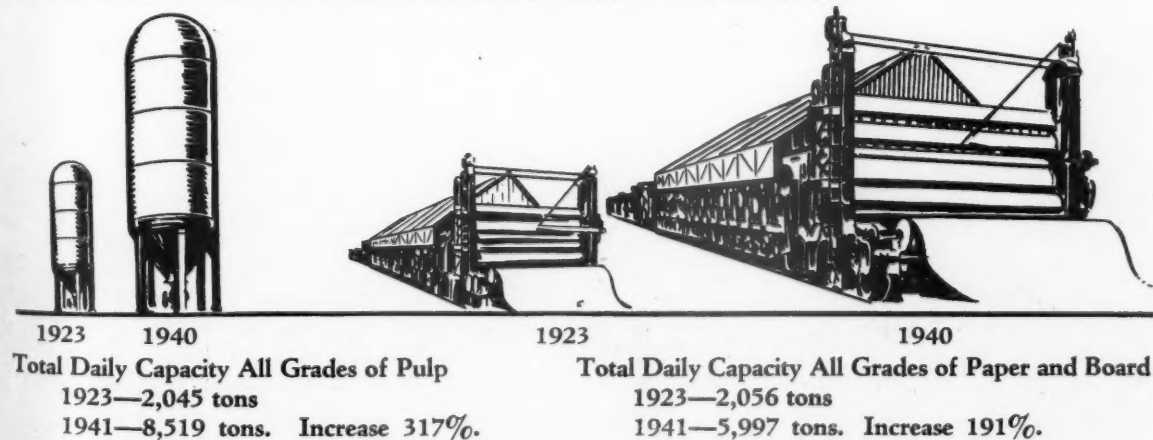
	1935 Cords	1936 Cords	1937 Cords	1938 Cords	1939 Cords	1940 Cords	1941† Cords
Washington	1,324,356	1,509,340	2,169,717	1,450,016	1,915,660	2,489,662	2,508,641
Oregon and California	369,327	423,839	511,419	342,229	468,534	579,804	777,719
British Columbia*	421,393	452,143	465,478	259,545	364,611	508,931	569,033
Total Pacific Coast	2,115,076	2,385,322	3,146,614	2,051,790	2,748,805	3,578,397	3,855,393

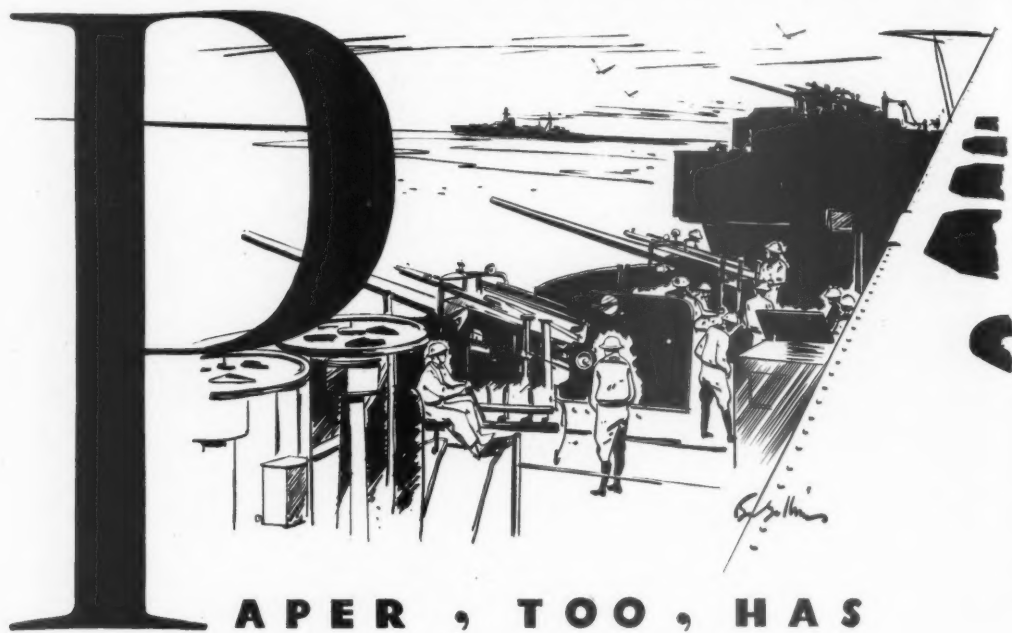
Source—U. S. figures from U. S. Dept. of Commerce, Bureau of Census; B. C. Figures from Dept. of Lands, Forest Branch; and Dominion Bureau of Statistics.

*Estimated.

U. S. Pacific Coast Wood Pulp
Production, 1923-1941

	1928	1935
Tons of 2,000 lbs.	562,514	1,011,421
1923	299,596	1,198,431
1924	309,433	1,523,192
1925	322,594	1,087,747
1926	378,005	1,384,147
1927	449,218	1,839,263
	1934	1,994,150
	1936	
	1937	
	1938	
	1939	
	1940	
	1941	

COMPARATIVE GROWTH
Of PACIFIC COAST PULP and PAPER INDUSTRY — 1923-1941



PAPER, TOO, HAS TAKEN ITS BATTLE-STATION

as, ever more resolutely, "the country is settling down for the hard and unspectacular job of prosecuting the war."*

Quick to switch from the fulfillment of its normal obligations and opportunities to the necessities and exigencies of a war economy, the paper industry has not been found wanting. Government needs have been met. And, withal, the valued customers of the years have not been overlooked.

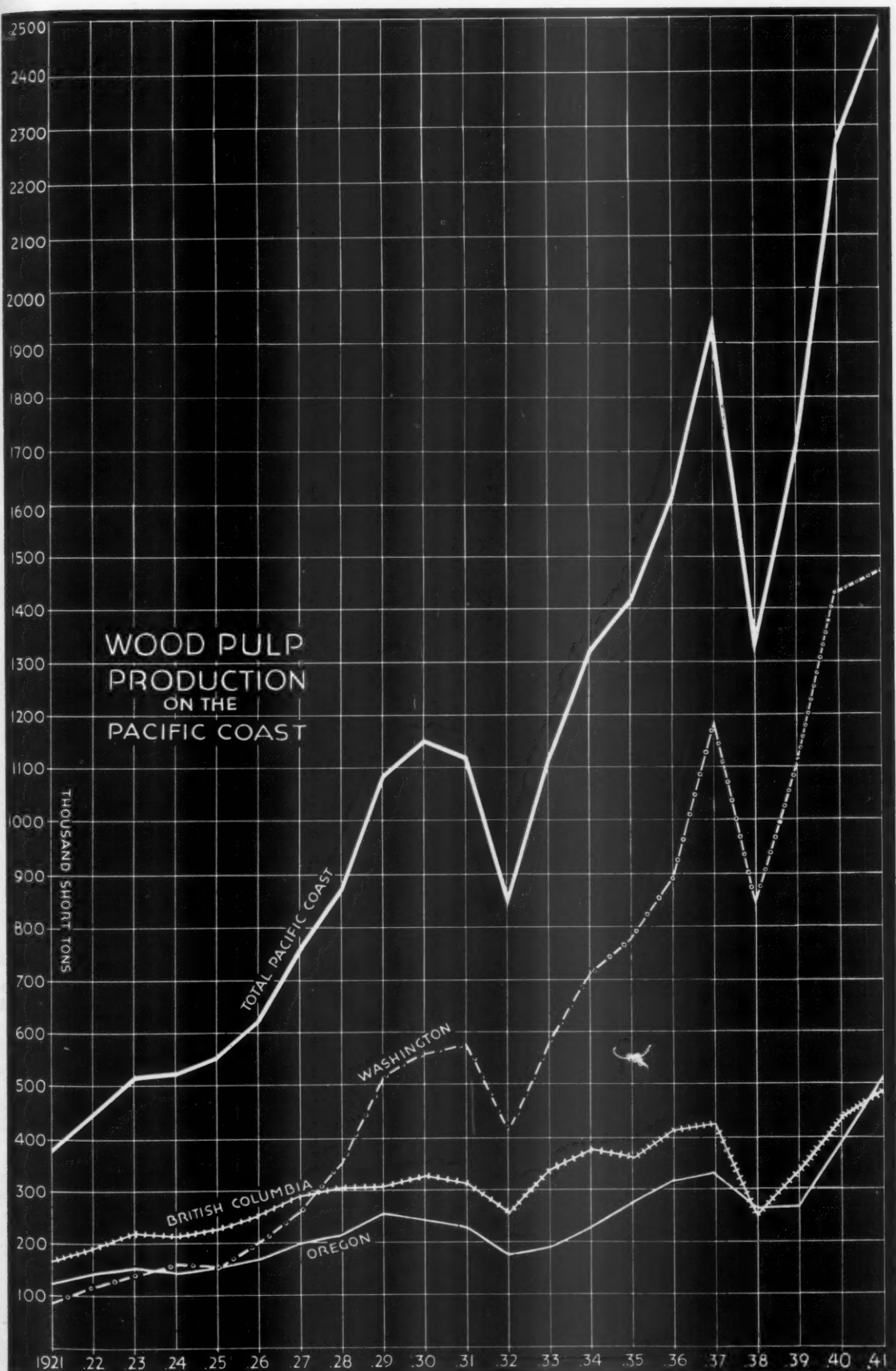
Proud we are to be part of an industry that, despite the besetting difficulties of maintaining equipment and the need to conserve in all ways possible, is contributing greatly, if unspectacularly, to the war production program.

*Business Week, 3-28



EVERETT PULP & PAPER CO.

Home Office and Mills: Everett, Washington



BRITISH COLUMBIA Review of Pulp and Paper Production 1919-1941

	—PULP—		Tons Groundwd	—PAPER—		Total Production All Grades—Tons		Estimated value of production:
	Sulphite	Sulphate		Newsprint	Other	Pulp	Paper	
1941				276,000	75,453	494,811	351,453	
1940				262,144	68,428	438,500	330,572	
1939				216,542	50,870	321,132	272,117	\$18,690,573
1938				176,639	39,348	242,020	222,305	14,562,479
1937				264,000	53,000	425,358	320,920	21,625,305
1936				276,710	41,443	416,433	320,555	19,012,369
1935				262,123	33,287	377,522	299,816	10,708,145
1934	130,176	15,630	209,359	267,406	26,777	383,818	299,502	10,347,123
1933	122,265	15,715	185,451	237,107	23,492	323,431	260,599	10,852,000
1932	85,419	10,889	161,502	205,050	24,051	259,586	228,075	11,156,000
1931	124,521	11,744	170,432	217,562	17,709	310,029	244,397	13,508,000
1930	130,462	13,055	172,539	224,928	20,446	316,056	245,374	16,520,000
1929	112,925	15,647	151,066	201,009	19,492	279,638	220,501	14,400,000
1928	120,413	15,050	170,005	225,477	15,960	305,468	241,437	16,755,000
1927	119,005	13,700	163,548	214,010	13,745	296,253	227,755	18,505,000
1926	108,381	15,000	136,123	176,924	10,389	259,504	187,313	16,315,000
1925	92,514	16,856	121,363	148,201	9,261	230,733	157,462	14,466,000
1924	89,839	14,403	112,001	136,281	9,653	216,243	145,934	13,938,000
1923	99,878	9,932	107,266	142,928	7,709	217,076	150,637	15,018,000
1922	86,894	9,674	100,759	124,639	7,945	197,327	132,584	12,590,000
1921	68,502	6,519	89,725	110,176	6,934	164,746	117,110	13,500,000
1920	92,299	16,380	108,655	136,832	9,792	217,334	146,624	
1919	80,347	9,473	99,769	123,607	7,202	189,589	130,809	

Source—British Columbia, Department of Lands, Report of the Forest Branch.

Wood Pulp Prices--1926 to 1941



A MIDNIGHT RIDE...

...to help a mill in distress

TIME ... 1938

PLACE ... a mill 200 miles from Middletown, Ohio

CALAMITY ... a broken gear on a dryer section, causing shut-down.

SOLUTION ... Shartle was called on to help but no record of gear in Shartle file. So Shartle sales engineer left Middletown at 6:00 P.M., arrived at mill at 12:00 Midnight, on way back by 2:00 A.M. Gear in production 11:00 A.M. next morning.

That's service . . . but here's the really important point to this story, and it happened three years later.

That same mill telephoned and a

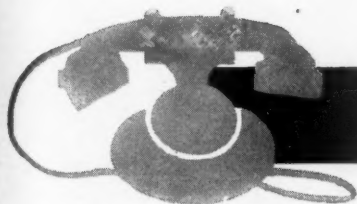
frantic voiced called, "Say, do you fellows have a pinion that will work on our dryer section? The dang thing just broke and we are desperate."

Well, we didn't know right offhand and we visualized another 400-mile ride to get more data. But we checked up . . . and found (now get this) that when our engineer was at this mill before, he had also checked the pinion as well as that gear, thinking that some day the information might prove useful.

Shartle makes it a policy, not only to give service in emergencies, but to look forward to possible future misadventures. Remember, our engineers are still eager to serve you during the duration.

SHARTLE BROTHERS, Middletown, Ohio

Division of Black-Clawson Company, Hamilton, Ohio
Pacific Coast Representative: MR. ROBERT PETRIE
3206 42nd Ave. N. E., Portland, Oregon.



SHARTLE BROTHERS

American Pulp Supplied 59% Of U. S. Market in 1941

American producers sold 59%, an increase of 9.2% over the 1940 share of 49.8%, or 30.8% over their 1939 percentage—Domestic sales of U. S. producers set a new record with 1,621,527 tons—Canada sold approximately 38% of all pulp sold in the U. S. in 1941 (estimate based for year upon 9 months imports reported) as compared with 34.5% in 1940 (Soda pulp not included).

American producers of pulp for the market responded in 1941 to the demand of paper, board and rayon plants for additional tonnage formerly supplied by overseas pulp producers by selling 1,621,527 tons compared with 1,225,600 tons in 1940, an increase of 395,927 tons or 32.3 per cent.

Their share of the total pulp sold to paper mills, rayon yarn plants, producers of cellulose sheeting and plastics, was 59 per cent, a gain of 9.2 per cent over the 49.8 per cent in 1940 and 30.8 per cent above their share of the 1939 market. American and Canadian producers together sold 97 per cent of all the pulp sold in the United States in 1941. The remaining 3 per cent came from Finland and from Labrador and Newfoundland.

The big gain in American producers' sales was, of course, due to the elimination of Scandinavian pulp

from the market, although the American percentage had gained slowly from 1934 through 1939 as will be noted by the graph on the opposite page.

The foreign producers supplied the United States with 1,128,000 tons of wood pulp (imports based on U. S. Pulp Producers Association), in 1941 as compared with 1,213,869 tons in 1940, a decline of 85,869 tons. The foreign percentage of the total dropped from 49.8 in 1940 to 41 per cent in 1941. In 1939 foreign producers supplied 2,017,345 tons or 889,345 tons more than was shipped to the United States buyers last year. (Soda pulp is excluded from all figures given although available in recent years. American soda pulp sales were formerly not released. To make 1941 figures comparable with prior years, soda sales are excluded).

Since 1934 United States producers of wood pulp for sale in the domestic market have increased their share of the total sold by 41 per cent, from 18 per cent in that year to 59 per cent in 1941. In 1934 the American producers sold by 388,456 tons out of a total of 2,187,120 tons, and the foreign producers supplied 82 per cent or 1,978,664 tons.

In 1935 United States pulp mills sold 443,811 short tons or 18 per cent of the total of 2,377,442 tons, the same percentage as in 1934. There was, however, a fractional gain as the percentage was actually 18.22 per cent. Foreign producers in 1935 supplied 81.87 per cent or 1,933,631 tons of the total sold in this country.

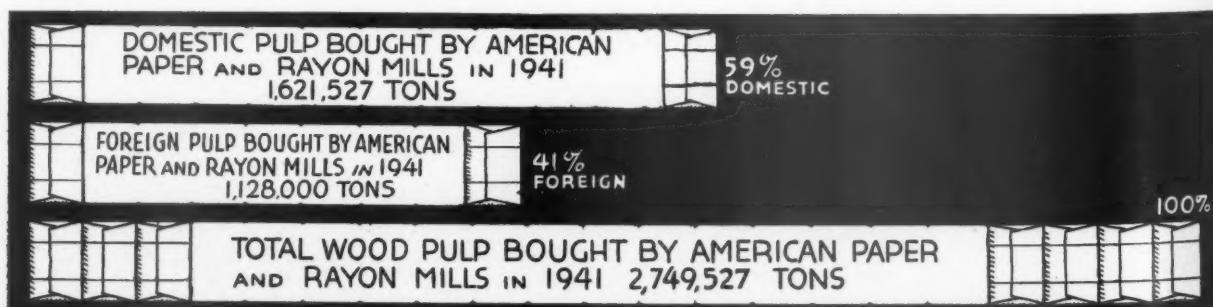
The next year, 1936, United States producers were able to make another small gain, selling 530,173 short tons or 18.72 per cent of the total of 2,795,265 short tons sold during the year. Foreign producers sold 81.28 per cent of the total or 2,265,092 tons.

In 1937 the share of the American pulp mills rose to 20.68 per cent or 621,717 short tons out of a total of 3,005,929 short tons sold. This was a percentage gain of 1.96 per cent over the 1936 percentage of 18.72. Foreign producers in 1937 held

In 1941—

**American Mills Bought 2,749,527 Tons of Wood Pulp.
Of This Total FOREIGN Pulp Mills Supplied 1,128,000 Tons.
Of This Total AMERICAN Pulp Mills Supplied 1,621,527 Tons.**

(Soda Pulp not included)



79.32 per cent of the market with sales of 2,384,212 short tons.

The year 1938 saw the share of American producers increase nearly 4 per cent over 1937 with 20.66 per cent or 556,153 short tons out of a total of 2,257,261 short tons bought by American purchasers. Foreign pulp producers' share dropped to 75.34 per cent of the total or 1,701,108 short tons.

In 1939 the American's share increased again, this time by 3.94 per cent over 1938 with 28.6 per cent or 808,339 tons of a total of 2,825,684 tons bought by American mills. The

foreign pulp producers' share declined to 71.4 per cent of the total or 2,017,735 tons.

The effect of the war stepped up the American's share in 1940 to 50.2 per cent, a jump of 21.6 per cent over the 28.6 per cent share in 1939. Their 1940 tonnage was 1,225,600 of a total of 2,439,469 tons. Foreign producers' share declined in 1940 to 49.8 per cent.

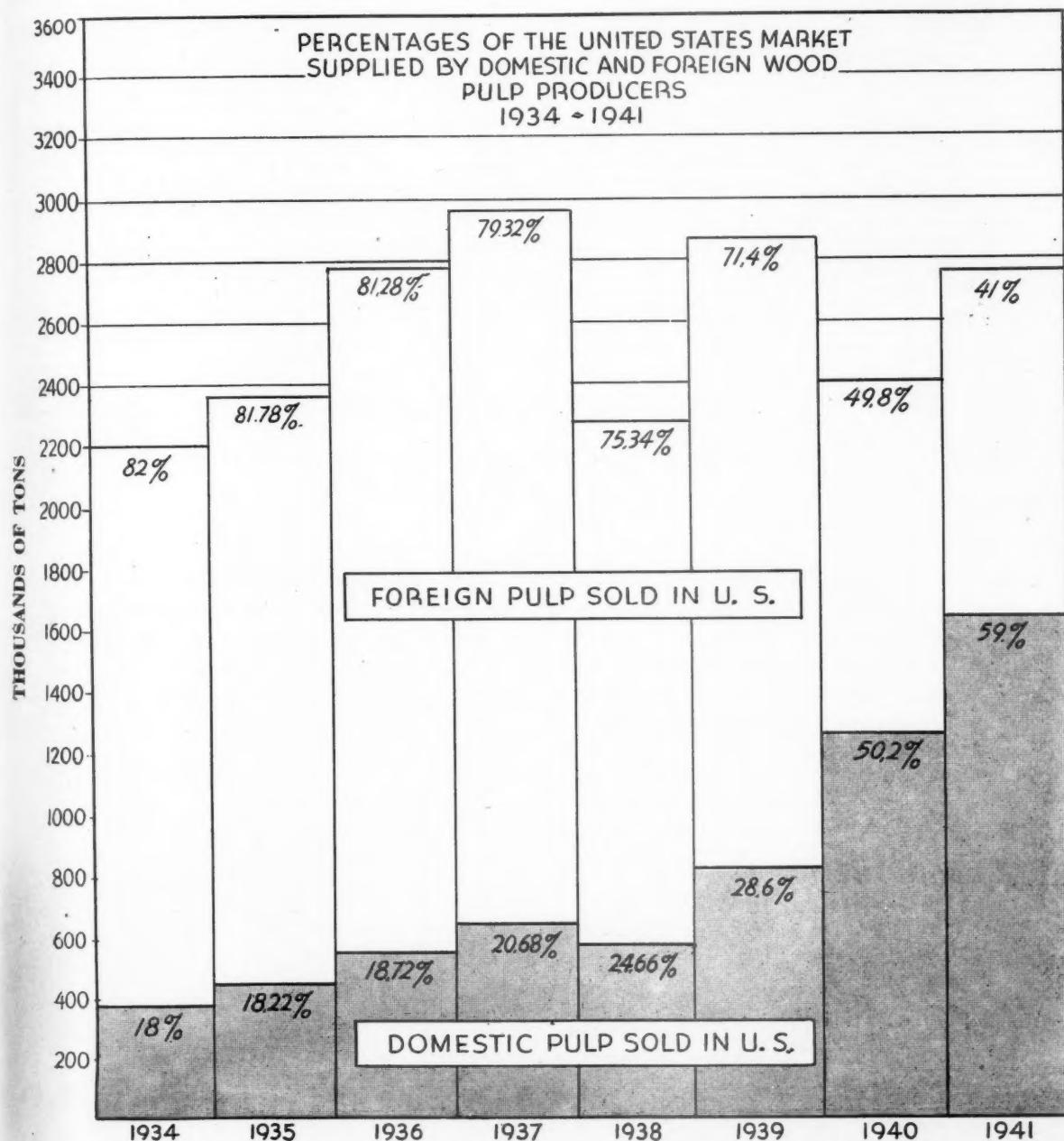
Domestic Sales Set New Record

● The 1,621,527 tons sold in the American market by U. S. pulp mills in 1941 established a new record.

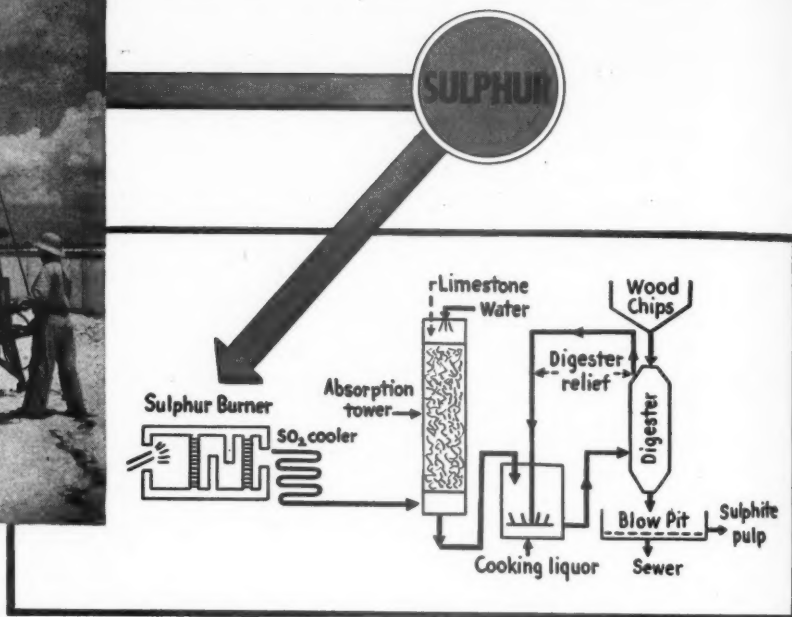
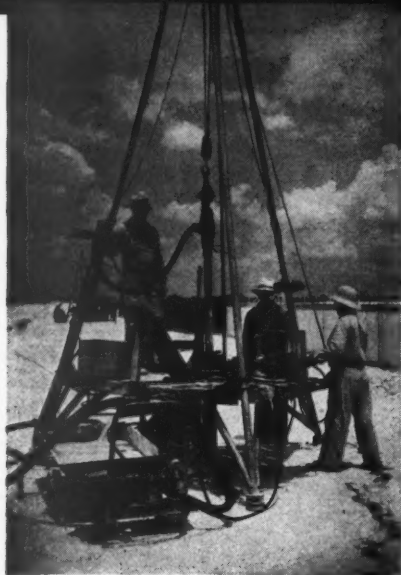
The gain over 1940's 1,225,600 tons was 395,927 tons or 32.3 per cent.

The increase in 1941 sales by domestic producers was 813,188 tons or over 100 per cent more than the 1939 sales of 808,339 tons. Compared with 1938 sales of 556,153 tons the gain is even greater. The 1941 sales gain by domestic manufacturers over 1938 was 1,065,374 tons or 191 per cent.

In the seven years since 1934 sales of wood pulp by United States producers to domestic buyers have risen 1,233,071 tons or 317 per cent over the 388,456 tons sold in that year.



HOW SULPHUR SERVES INDUSTRY



SULPHITE PULP

Sulphur is burned to sulphur dioxide. This combines with water and limestone in the absorption tower to form a bisulphite cooking liquor. Logs are cut into chips. These are then cooked in the digester with the bisulphite cooking liquor which takes non-cellulose parts of the wood into solution, leaving the cellulose fibers. These fibers in water suspension are the sulphite wood pulp.

Sulphite pulp is the most versatile of all chemical wood pulps. In varying proportions it goes into all kinds of white papers. In a highly purified form it is a raw material for rayon, cellophane and explosives. It may even be used as a substitute for absorbent cotton.

Sulphite pulp ranks next to sulphuric

acid as a consumer of Sulphur. In its preparation, it requires a large amount of this vital raw material. Pulp producers and other consumers are assured of a continued abundance of Sulphur. Texas Gulf Sulphur Company has available for immediate shipment more than a year's supply for all industries.

TEXAS GULF SULPHUR CO.
 75 E. 45th Street New York City
 Mines: Newgulf and Long Point, Texas

PROPORTION OF UNITED STATES MARKET FOR PULP SUPPLIED BY AMERICAN PULP MILLS AND FOREIGN PULP MILLS*—1939-1940-1941

Tons—2,000 Lbs.

TOTALS By Grades.	1939		1940		1941†	
	Pulp Produced By U. S. Mills for Sale in Domestic Market—1939	Pulp Imported Into the United States 1939	Pulp Produced By U. S. Mills for Sale in Domestic Market—1940	Pulp Imported Into the United States 1940	Pulp Produced By U. S. Mills for Sale in Domestic Market—1941	Pulp Imported Into the United States 1941
Total—All Grades	963,162	2,026,297	1,366,879	1,224,632	1,723,584	1,145,000
Total—Sulphite	685,774	1,135,302	1,005,415	733,829	1,228,530	740,000
Bleached Sulphite	464,296	474,109	635,264	352,916	767,970	369,000
Rayon	106,760	88,052	166,176	113,945	196,564	122,000
Other	319,687	386,057	469,088	238,971	571,406	267,000
Unbleached Sulphite	219,012	661,193	370,151	380,913	460,560	351,000
Total—Sulphate	143,614	654,419	219,185	308,464	319,341	176,000
Bleached Sulphate	77,786	108,252	75,658	84,887	72,968	60,000
Unbleached Sulphate	65,793	546,167	143,527	223,577	246,373	116,000
Total Groundwood	30,194	227,432	40,800	171,513	57,862	204,000
Total Soda	86,591	8,952	97,400	10,763	111,200	17,000
Total Semi-Chemical					6,513	
Total—Miscellaneous, Damaged and Off-Quality	16,189	192	27,815	63		

*Table prepared by Pacific Pulp & Paper Industry from United States Pulp Producers Association data on wood pulp production, shipments and stocks; and from import data supplied by the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

†Pulp Produced By U. S. Mills for Sale in Domestic Market includes that part of the stocks on hand at the end of the year intended for future shipment to domestic buyers.

†1941 figures estimated by United States Pulp Producers Association.

FOR IMMEDIATE
RELEASE
May 2, 1942

U. S. DEPARTMENT OF COMMERCE
Bureau of the Census
Washington

CURRENT
STATISTICAL
SERVICE

CELLULOSE PLASTIC PRODUCTS

March 1942

According to figures released today by Director J. C. Capt, Bureau of the Census, Department of Commerce, the March production of nitrocellulose sheets, rods, and tubes as reported by 10 manufacturers amounted to 1,434,262 pounds, an increase of 4.2 percent as compared with 1,376,003 pounds produced the previous month, and a 9.7 percent increase over the 1,307,593 pounds reported for March 1941. The production of cellulose acetate sheets, rods, and tubes in March 1942 as reported by 5 manufacturers amounted to 519,357 pounds, an 8.3 percent decrease as compared with 566,575 pounds reported for February 1942. The March 1942 production of cellulose acetate molding composition as reported by 8 manufacturers, amounted to 3,645,633 pounds, an increase of 4.7 percent as compared with the February 1942 production of 3,477,850 pounds, and a 63.3 percent increase over the 2,231,630 pounds reported for March 1941.

The table below presents statistics on production, shipments, and consumption in reporting company plants of nitrocellulose and cellulose acetate sheets, rods, and tubes covering practically the entire industry. Data on molding composition were reported by 8 manufacturers for the months of 1942, 1941 and 1940.

PRODUCTION, SHIPMENTS, AND CONSUMPTION IN REPORTING COMPANY PLANTS (POUNDS)

Year and month	NITROCELLULOSE						Sheets, rods, and tubes consumed in reporting company plants	CELLULOSE ACETATE				
	SHEETS		RODS		TUBES			SHEETS, RODS, AND TUBES 1/			MOLDING COMPOSITION	
	Production	Shipments 2/	Production	Shipments 2/	Production	Shipments 2/		Production	Shipments 2/	Consumed in reporting company plants	Production	Shipments 3/
1942												
January.....	1,113,319	1,191,391	562,840	408,070	141,458	155,397	271,574	586,319	541,536	23,642	5,788,786	5,597,005
February.....	922,605	1,050,519	519,840	350,342	134,158	144,426	250,808	566,575	504,428	33,428	5,477,850	5,224,519
March.....	1,006,242	964,379	296,100	269,535	131,920	159,591	241,902	519,357	486,470	22,069	5,645,633	5,444,574
Total.....	3,042,166	3,226,089	978,780	1,028,005	407,516	459,414	764,284	1,671,251	1,532,434	79,137	10,910,269	10,265,896
1941												
January.....	719,336	704,497	349,402	329,138	97,794	76,760	185,024	616,525	674,574	7,066	1,631,502	1,583,865
February.....	720,173	755,513	314,560	299,795	97,399	89,831	230,041	543,606	335,009	2,884	1,878,807	1,841,978
March.....	844,819	794,199	363,429	342,024	99,345	96,298	248,980	464,601	372,804	10,169	2,231,630	1,990,982
Total (3 mos.)..	2,284,328	2,254,209	1,027,391	970,955	294,538	264,889	664,045	1,424,731	1,382,387	20,119	5,741,939	5,216,845
April.....	927,399	819,465	556,179	542,446	136,048	104,665	216,633	402,492	406,252	12,311	2,254,895	2,102,084
May.....	935,239	963,997	506,749	546,031	130,457	104,711	214,631	524,595	472,326	13,688	2,319,133	2,145,523
June.....	913,725	998,185	332,433	363,191	140,482	124,067	241,562	512,506	525,438	17,907	2,457,497	2,264,470
July.....	851,762	895,069	291,167	330,943	166,022	127,116	229,092	507,061	541,039	14,212	2,467,166	2,346,469
August.....	975,085	1,025,638	315,778	339,597	148,280	145,070	243,030	572,695	579,695	17,237	2,870,007	2,506,395
September.....	982,617	1,022,104	334,579	410,546	161,655	132,549	285,587	585,441	621,557	18,671	2,990,830	2,813,225
October.....	1,016,077	1,062,598	354,111	411,953	171,123	165,588	251,519	630,357	722,999	20,622	3,459,206	3,453,046
November.....	1,018,435	1,096,362	337,228	345,694	127,349	127,572	206,467	557,758	624,451	21,722	2,978,546	2,777,517
December.....	999,700	1,145,634	345,973	376,567	150,920	136,013	269,146	500,697	549,895	23,251	3,397,396	3,165,174
Total (year)....	10,692,557	11,160,301	5,979,568	6,237,925	1,626,674	1,454,240	2,681,732	6,218,151	6,426,039	179,940	30,716,617	28,790,546

1 - Beginning with February 1941 data does not include production or shipments of cellulose acetate safety glass sheets.

2 - Includes consumption in reporting company plants.

3 - Excludes consumption in reporting company plants.

All Records Broken By 1941 Paper, Paperboard Production

Paper and Paperboard production of 17,280,000 tons was 19.3% higher than 1940 and 27.9% higher than 1939—Consumption rose from 16,620,632 tons to 19,768,325 tons in 1941, a gain of 3,147,693 tons or 18.9%.

ALL previous production and consumption records were far surpassed by the 1941 output and use of paper and paperboard. The American Paper & Pulp Association estimates the 1941 production of all grades to have been 17,280,000 tons, 2,796,291 tons or 19.3 per cent higher than the 14,483,709 tons produced in 1940. The 1941 production was 3,770,358 tons or 27.9 per cent above the 1939 production of 13,509,642 tons.

Consumption rose from 16,620,632 tons in 1940 to 19,768,325 tons in 1941. This was an increase of 3,147,693 tons or 18.9 per cent. Compared with 1939 the consumption gain was even higher. The 1939 figure was 15,930,349 tons and the 1941 increase over the two-year period was 3,837,976 tons or 24 per cent.

It is interesting to note that the 1941 consumption of 19,768,325 tons hit exactly the consumption curving projected in 1938 through 1950 by Charles W. Boyce, then secretary of the American Paper & Pulp Association. The chart appears on page 29.

Production of all grade showed increases in 1941 although the estimated newsprint production of 1,058,000 tons was but 1,696 tons more than the 1940 production.

The estimated production of groundwood printing and specialty

papers of 602,000 was 51,547 tons or 9.4 per cent more than the 550,453 tons produced in 1940.

Book paper production rose 364,577 tons or 22 per cent with a total of 2,020,000 tons against 1,655,423 tons in 1940.

Text paper production, estimated at 13,000 tons, was 1,935 tons or 17 per cent over the 11,065 tons made in 1940.

Cover paper, with a 1941 production of 28,000 tons was 1,056 tons above the 1940 production of 26,944, an increase of 5 per cent.

Writing paper production is estimated by the Writing Paper Manufacturers Association at 735,000 tons for 1941 against 599,452 tons the year before. This was a gain of 135,548 tons or 22.6 per cent.

Production of wrapping paper, sulphite, kraft and others, rose from 2,500,818 tons in 1940 to an estimated 2,860,000 tons last year, an increase of 359,182 tons or 14.3 per cent.

Tissue paper production of 870,000 tons was 108,288 tons or 14.2 per cent more than the 761,712 tons produced in 1940.

Absorbent paper production, estimated at 154,000 tons for 1941 was 24,590 tons or 19 per cent over the 1940 production of 129,410 tons.

Building papers totaled 853,000 tons last year. This was a gain of 170,540 tons or 25 per cent above

the 1940 figure of 682,460 tons. All other papers totaled 67,000 tons last year against 60,120 tons in 1940. This was an increase of 6,880 tons, 11.4 per cent.

All grades of paperboard were estimated by the National Paperboard Association to have totaled 8,020,000 tons in 1941, a gain of 1,570,452 tons or 24.3 per cent.

On the consumption side the American Paper & Pulp Association estimated as follows: Paperboard, 7,909,300 tons; Wrapping papers, 2,767,400 tons; Writing, Cover and Text papers, 718,925 tons; Book papers, 2,007,125 tons; Groundwood papers, Tissues, Absorbent, Building and all others, 2,491,150 tons; Newsprint, 3,874,425 tons.

Production Ratios

● The year 1941 began with a production ratio to capacity of 85.6 per cent, according to the American Paper & Pulp Association's weekly report which is based upon a six-day week. This January, 1941, ratio was 3.5 per cent below the 89.1 per cent in January, 1940. However, it was 8.1 per cent higher than the 77.5 per cent ratio for January, 1939.

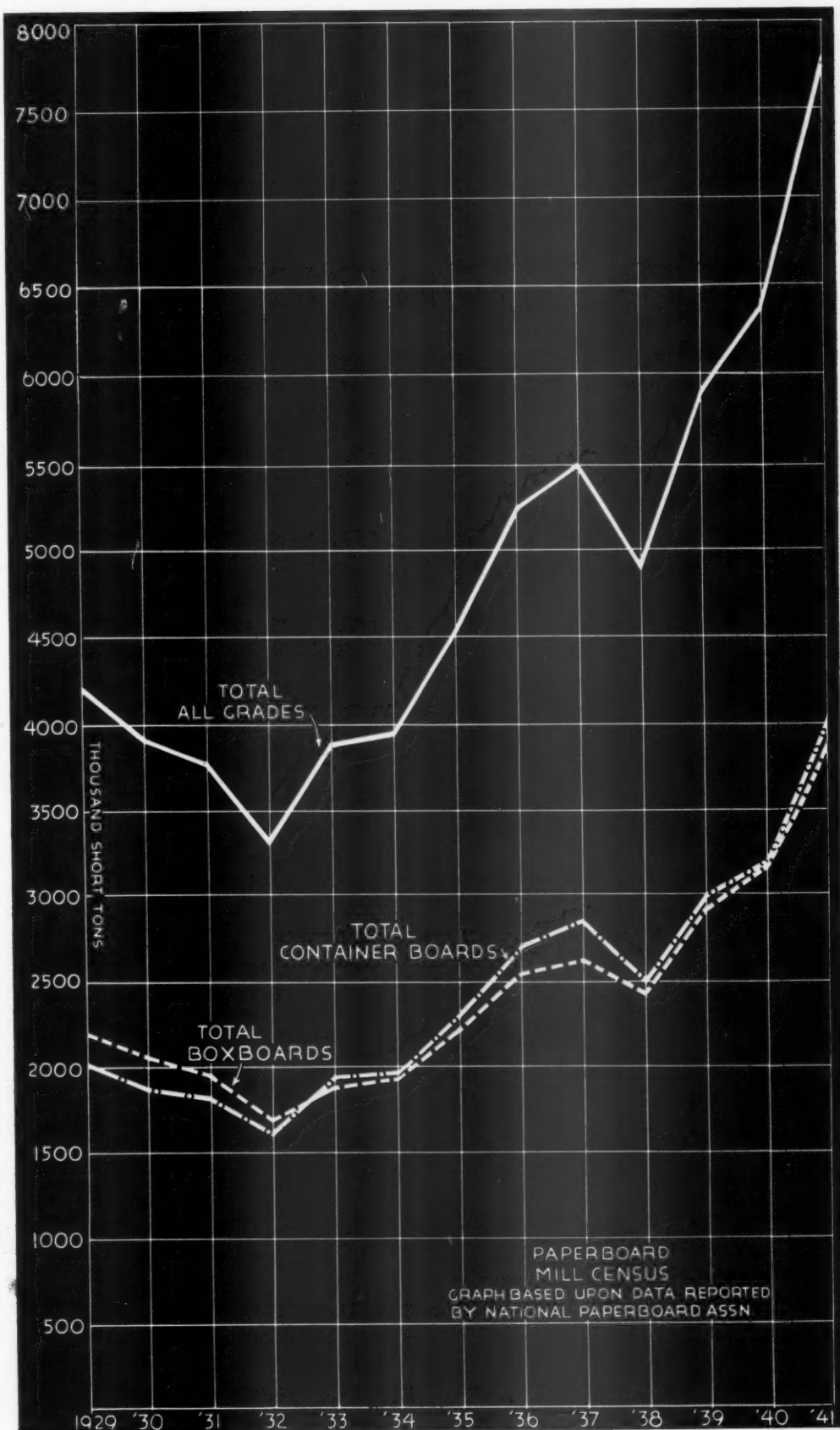
From 85.6 per cent in January the ratio of production to capacity rose month by month; 89.7 in February; 92.2 in March; 96.0 in April; 98.7 in May; 99.3 in June; 94.2 in July; and the 100 per cent mark was passed

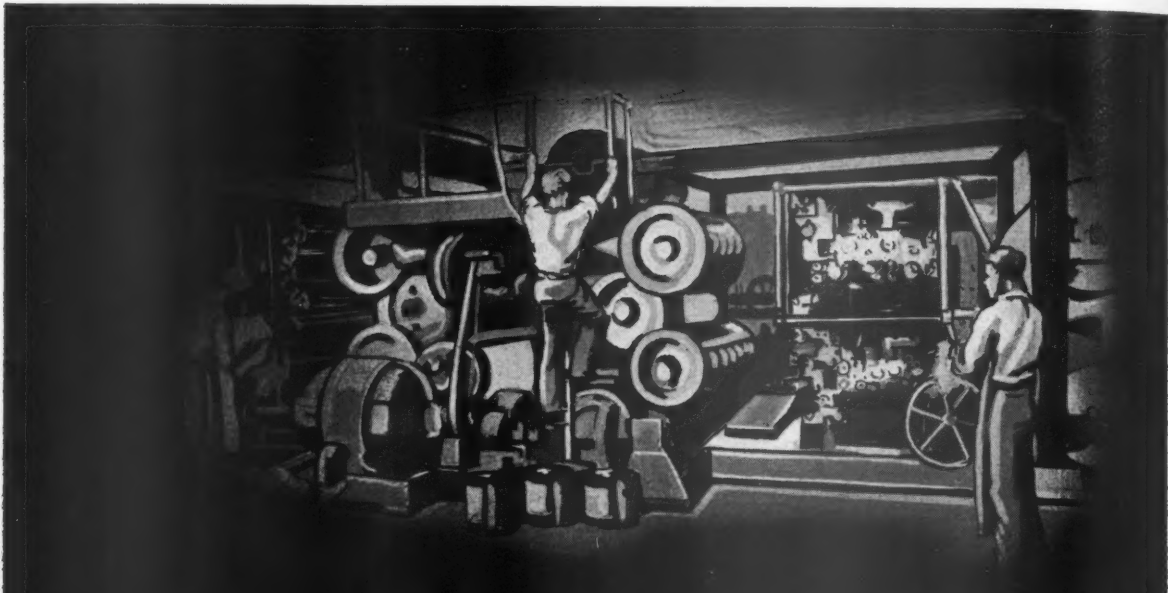
U. S. PAPER PRODUCTION—1936-1941

(Tons of 2,000 lbs.)

	1936	1937	1938	1939	1940	1941
Total—All Grades	11,975,552	12,837,003	11,380,814	13,509,642	14,483,709	17,280,000
Newsprint	938,287	975,854	832,331	954,259	1,056,304	1,058,000
Book papers	1,438,046	1,520,523	1,336,814	1,534,591	1,655,423	2,020,000
Paperboard	5,454,637	5,802,036	5,103,767	6,104,968	6,449,548	8,020,000
Wrapping	1,879,323	2,053,387	1,865,856	2,238,993	2,500,818	2,860,000
Writing	603,853	578,147	481,719	594,594	599,452	735,000
Cover	24,000	24,437	20,216	19,401	26,944	28,000
Tissue	494,721	540,152	548,943	665,723	761,712	870,000
Absorbent	105,000	138,064	126,320	121,717	129,410	154,000
Building	549,701	608,086	570,454	659,090	682,460	853,000
All Other	238,117	596,317	494,394	625,306	621,638	82,000

*Bureau of Census, U. S. Department of Commerce, Census of Manufacturers for 1936, 1937, 1938, 1939 and 1940. 1941 estimates by the American Paper and Pulp Association and allied associations.





The top illustration shows a dark, industrial interior of a pulp mill. Several large, horizontal rollers or drums are visible, with a worker standing on a platform between them. In the background, another worker is visible near a large wheel or flywheel. The scene is dimly lit, with light coming from a window or opening in the background.



The middle illustration shows a worker in a dark, industrial setting operating a large, vertical hand press. The worker is leaning over the machine, which has a large, rectangular frame and a heavy, horizontal bar. The scene is dimly lit, with light coming from a window or opening in the background.

PULP quality and production speed are more important today than at any time since the days of the old hand press. Comparable to the advance of printing newspapers is the contribution made by Norton pulpstone to the groundwood newsprint industry.

For any grinding problem consult Norton engineering.

NORTON COMPANY
WORCESTER, MASS.



The bottom illustration shows a large, cylindrical grinding stone. The stone has a hexagonal pattern on its side and a large, circular opening in the center. A small label with the Norton logo is visible on the top edge of the stone.

in August with 101.0. September dropped to 99.6 per cent, but October rose to a new high of 105.1. November went still higher to 106.0. December declined due to the holidays to 100.7 per cent.

The average for 1941 was 97.3 per cent, the highest percentage of production to capacity on record. This was 11.7 per cent greater than the 85.6 per cent in 1940. Through the first four months of 1942 the ratio held at 100 or better but dropped to 97.8 the second week in May.

Paperboard Operations

● The National Paperboard Association, reporting production to capacity on an "inch-hours" basis, showed the industry's production to have been at 75 per cent in January, 1941, as compared with 71 per cent in January, 1940, and 60 per cent in January, 1939.

The operating ratio rose to 81 in February; to 82 in March; to 83 in April; to 84 in May; to 88 in June. In July it dropped back to 86, but hit a new high of 94 in August and this figure held in September. October saw the ratio climb to 99, but in November it was back to 98 and in December dropped to 93.

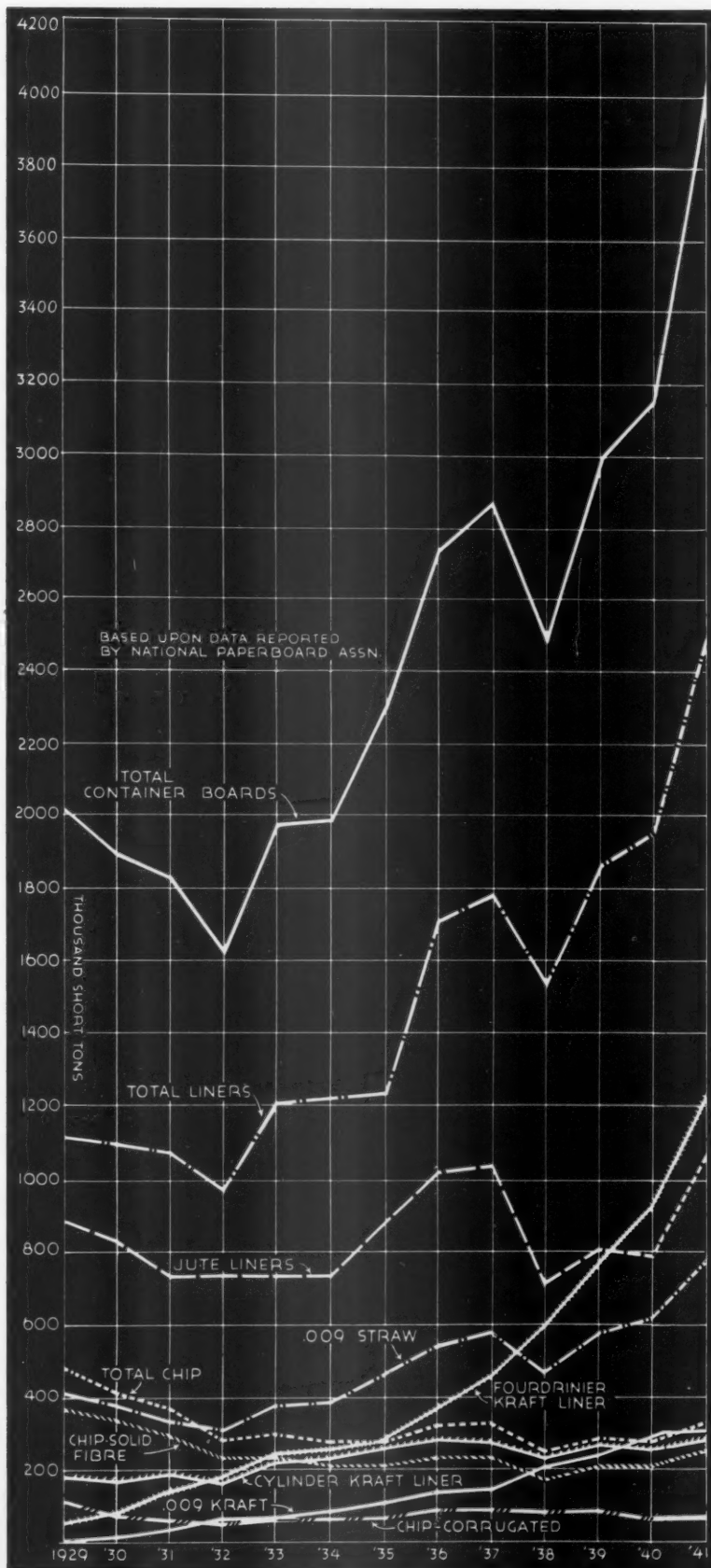
The year ended with an average operating ratio for the paperboard industry of 88, a new record. This compares with an average ratio of 73 for 1940; 70 for 1939; 61 for 1938; 73 for 1937 and 72 for 1936.

No Serious Shortages

● Early in 1941 there was much talk about shortages in the several grades of paper. Uncertainty was prevalent over how large the demands of the Army, Navy and war industries would become. Thinking generally was predicated upon taking care of a booming civilian economy plus the war demands, then called defense. Over the entire industry these shortages failed to develop. Production responded to demand. Here and there were temporary shortages in board, in bags, in wrapping papers. Users became fearful and increased orders beyond normal demands. As a result of this forward buying it is reported there are large stocks in the hands of users as well as jobbers at the present time.

In its October, 1941, Monthly Statistical Summary the American Paper & Pulp Association said:

"During the past few months much has been said and written regarding the current paper situation, much of it, unfortunately, by persons not fully provided with the facts. In order that those interested

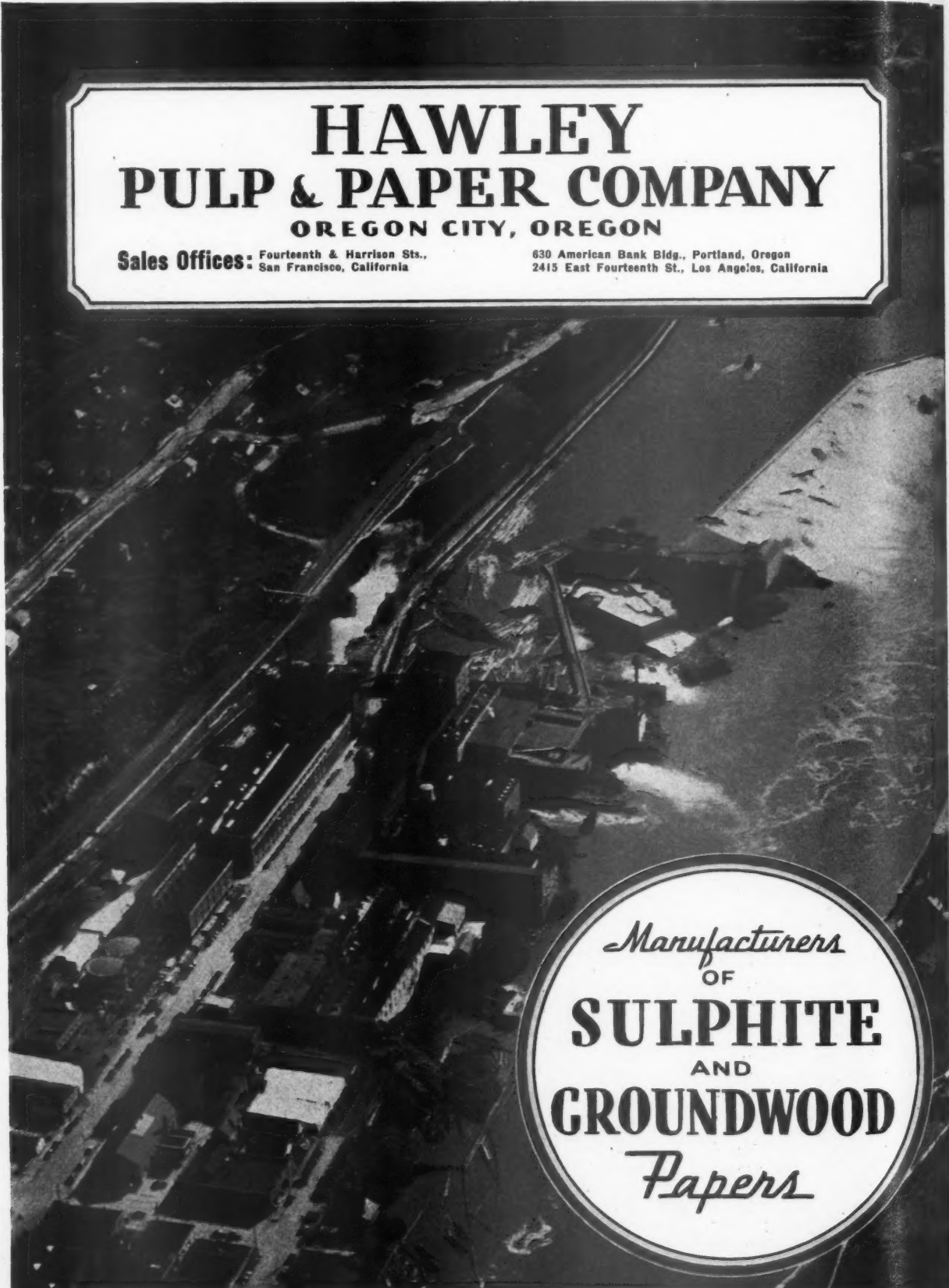


HAWLEY PULP & PAPER COMPANY

OREGON CITY, OREGON

Sales Offices: Fourteenth & Harrison Sts.,
San Francisco, California

630 American Bank Bldg., Portland, Oregon
2415 East Fourteenth St., Los Angeles, California



Manufacturers
OF
SULPHITE
AND
GROUNDWOOD
Papers

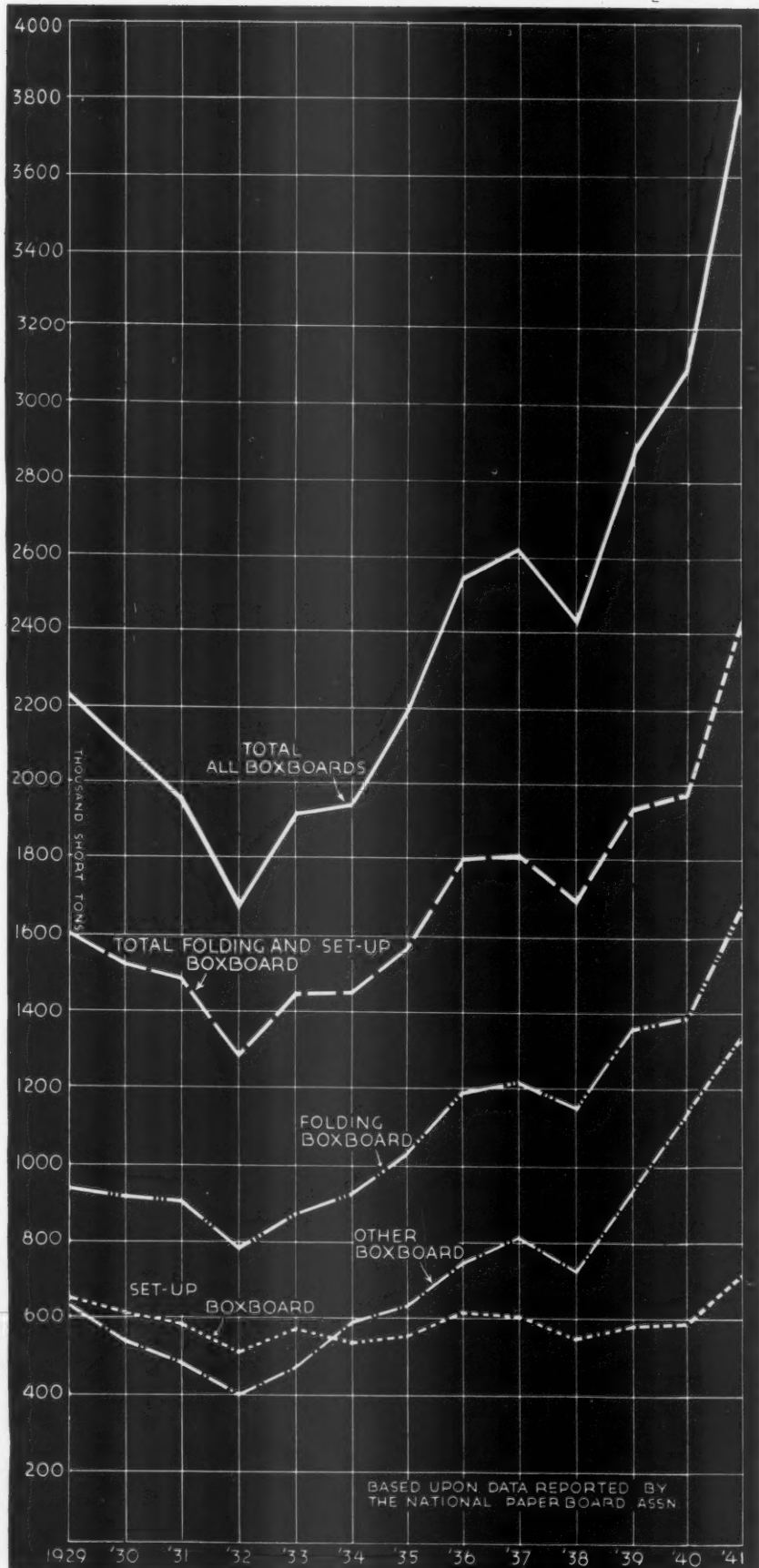
may be fully informed the following data are presented.

"Since early in the year there has been a tremendous demand for manufactured goods. This demand has included not only actual requirements, which have been abnormally large due to greatly increased general business activity, but has been augmented by consumer fears of possible shortages in the future as the defense effort requires more and more of our industrial effort. To a large extent it also resulted from efforts to obtain goods before price increases, resulting from increased production costs, became effective. Today it is generally believed that large inventories of such goods exist in the hands of producers, distributors and consumers.

"Due to these developments the paper industry has been faced with an unprecedented demand for its products upon which has been superimposed the direct and indirect demands for paper for defense purposes with the net result that by September the largest file of unfilled orders in the history of the industry had been accumulated. The peak of orders for the paper industry occurred in May with orders for paper (excluding building paper and paperboard) exceeding production by approximately 85,000 tons. Paper production, however, has been expanding progressively since the first of the year until in October it was actually in excess of orders, with order backlogs showing the first decline since January, 1941.

"The tremendous effort of paper manufacturers in meeting the enormous demand is best illustrated by October statistics. During this month production of all grades of paper and paperboard reached the staggering total of approximately 1,600,000 tons, or an annual rate of 19,000,000 tons. With imports at the current annual rate of 3,000,000 tons it can be seen that during the month of October paper was currently available at an annual rate of 22,000,000 tons, some 4,500,000 tons in excess of the previous record year of 1940. It is believed that this rate of supply will be adequate for both defense and civilian needs in most grades of paper, particularly in view of the direct and hidden inventories which are believed to exist in the hands of converters, consumers, manufacturers and distributors.

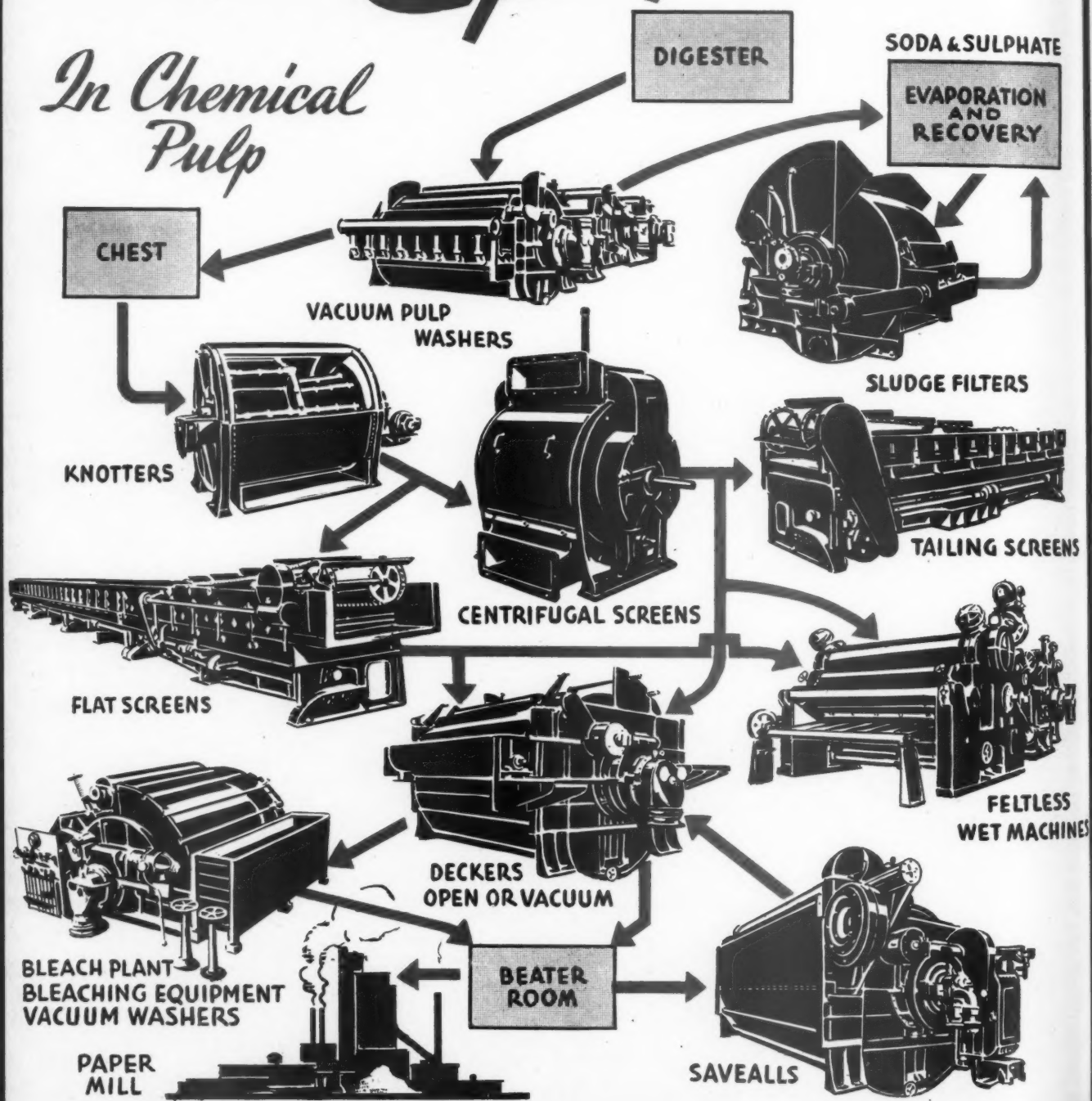
"As the year draws to a close there are indications that also approaching an end is the initial phase of World War II economy, an economy that has been characterized by the "everything for defense, but





Equipment

In Chemical Pulp



MAKERS OF THE FOLLOWING MACHINES FOR THE PAPER INDUSTRY
 ROTARY AND FLAT SCREEN KNOTTERS · CENTRIFUGAL SCREENS · FLAT SCREENS WITH DUNBAR DRIVE
 METAL OR CYPRESS VATS · VACUUM FILTERS, INCLUDING SAVE-ALLS, WASHERS, HIGH DENSITY THICK-
 ENERS, LIME SLUDGE FILTERS, BLACK LIQUOR WASHERS, FORMING CYLINDERS · MULTIPLE STAGE

PAPERBOARD MILL CENSUS In Tons

CONTAINER BOARDS

GRADES.	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941
Liners-Jute	604,000	735,100	737,300	888,700	1,029,300	1,047,600	674,900	794,300	796,400	1,078,000
Liners-Kraft Cyl.	171,300	227,000	232,900	262,600	285,900	290,800	238,900	279,800	246,200	286,200
Kraft Four.	190,300	252,300	257,700	289,600	389,600	461,600	638,200	803,800	923,300	1,201,800
Total Kraft	361,600	479,300	490,600	552,200	675,500	752,400	877,100	1,083,600	1,169,500	1,488,000
Total Liners	965,600	1,214,400	1,227,900	1,440,900	1,704,800	1,800,000	1,552,000	1,877,900	1,965,900	2,566,000
Chip-Corrugating	53,000	61,700	66,100	70,200	97,700	96,200	76,500	75,900	75,500	75,400
Solid Fibre	228,100	242,900	209,100	210,700	237,000	246,800	177,800	208,600	202,800	274,600
Total Chip	281,100	304,600	275,200	280,900	334,700	343,000	254,300	284,500	278,300	350,000
.009 Straw, Etc.	299,700	386,200	394,000	472,800	556,800	589,200	461,400	574,900	611,400	783,700
.009 Kraft.	73,300	73,700	89,000	114,400	141,900	148,300	212,100	263,000	292,000	348,500
Total .009	373,000	459,900	483,000	587,200	698,700	737,500	673,500	837,900	903,400	1,132,200
TOTAL	1,619,700	1,978,900	1,986,100	2,309,000	2,738,200	2,880,500	2,479,800	3,000,300	3,147,600	4,048,200*

BOXBOARDS

Folding Box	778,300	883,600	926,800	1,034,600	1,198,400	1,223,800	1,150,400	1,370,700	1,398,500	1,724,700
Set-up Box	479,900	551,700	506,000	531,100	587,700	570,000	518,800	585,700	590,500	733,200
Total	1,258,200	1,435,300	1,432,800	1,565,700	1,786,100	1,793,800	1,669,200	1,956,400	1,989,000	2,457,900
Other	411,100	490,000	510,700	642,800	770,900	839,200	753,600	947,600	1,137,800	1,351,400
TOTAL	1,669,300	1,925,300	1,943,500	2,208,500	2,557,000	2,633,000	2,422,800	2,904,000	3,126,800	3,809,300

SUMMARY

JUTE, Chip, Boxboard	2,837,300	3,322,500	3,301,900	3,789,300	4,416,800	4,534,700	3,740,900	4,430,800	4,589,300	5,844,000*
Straw, Etc.	451,700	581,700	627,700	728,200	878,400	978,800	1,161,700	1,473,500	1,685,100	2,013,500
KRAFT, Liner, .009 Etc	3,289,000	3,904,200	3,929,600	4,517,500	5,295,200	5,513,500	4,902,600	5,904,300	6,274,400	7,857,500*

Issued February, 1942

*In addition, Canadian imports of Corrugating Material were 106,200

NATIONAL PAPERBOARD ASSOCIATION

UNITED STATES

Paperboard—Operation, Production, Orders¹

(.012 of an inch or more in thickness)

Year and Month—1939	—Operation—(Inch hours ²)—		—Production—(Short tons)—		New orders		Unfilled orders and month (Short tons)
	Rated Capacity	Operated	Per Cent of Capacity	Rated Capacity	Output	Per Cent of Capacity	
January	17,679,388	13,663,344	77.3	587,024	446,979	76.1	520,931
February	16,623,023	13,056,407	78.5	522,994	426,419	81.5	470,671
March	18,076,675	14,605,675	80.8	568,542	485,758	85.4	543,988
April	18,032,435	15,025,382	83.3	568,542	499,930	87.9	580,038
May	18,672,118	15,659,139	83.9	588,595	526,286	89.4	572,522
June	17,415,894	15,121,749	86.8	546,675	504,413	92.3	525,325
July	18,415,125	15,265,639	82.9	588,595	503,620	85.6	569,252
August	17,496,490	15,933,129	91.1	568,542	545,116	95.9	565,853
September	16,885,408	15,607,342	92.4	566,728	538,405	95.0	542,792
October	17,076,509	16,656,204	97.5	590,409	583,668	98.9	595,634
November	15,726,085	15,267,021	97.1	544,871	536,646	98.5	527,829
December	16,751,989	15,787,042	94.2	588,595	545,050	92.6	521,866
Total (Year 1941)	208,851,139	181,648,073	87.0	6,830,102	6,142,290	89.9	6,536,701
Total (Year 1940)	222,951,990	159,269,644	71.4	7,079,959	5,175,107	73.1	5,112,272
Total (Year 1939)	224,509,968	156,009,731	69.5	6,842,087	4,882,636	71.4	4,984,774
Total (Year 1938)	201,659,468	125,473,369	62.2	6,188,954	3,816,502	61.7	3,827,460
Total (Year 1937)	193,449,553	143,747,844	74.3	5,648,035	4,293,717	76.0	4,163,060
Total (Year 1936)	176,217,757	129,343,411	73.4	5,001,147	3,658,871	73.2	3,720,996
Total (Year 1935)	178,529,564	119,579,631	67.0	4,861,628	2,294,055	67.8	3,281,525
Total (Year 1934)	176,800,951	105,201,235	59.5	4,767,029	2,839,705	59.6	2,807,470
Total (Year 1933)	165,594,126	105,986,270	64.0	4,619,730	2,912,374	63.0	2,913,370
Total (Year 1932)	138,115,824	75,979,629	55.0	3,904,824	2,152,045	55.1	2,148,991
Total (Year 1931)	137,218,968	91,894,961	67.0	3,879,836	2,556,851	65.9	2,527,024
Total (Year 1930)	139,179,840	96,843,592	69.6	3,917,436	2,699,595	68.9	2,685,373

¹Monthly statistics compiled from data furnished by the National Paperboard Association from reports of members, and by manufacturers reporting direct to the Bureau of Census, are presented in the above tables. These statistics were released by Director J. C. Capt, Bureau of the Census, Department of Commerce.

²Rated (24-hour) capacity data for paperboard machines in inch hours in this report are based on last dryer width whereas those shown in the reports for 1932 and earlier years were based on maximum trim width. The capacity data vary according to the normal number of working days in each month.

SEE HOW YOU SAVE TIME

Extra Convenience Features

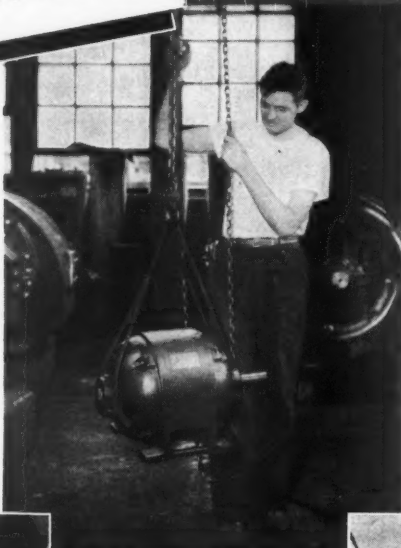
help you get the Tri-Clad motor into service faster—keep it in service with less attention.

WITH THE **TRI-CLAD** MOTOR

REG. U.S. PAT. OFF.

1. Easy to Handle

They can be moved into position easily because of their light weight and compactness. The shape of the bearing housings and the location of end-shield fittings make it easy to handle Tri-Clad motors with slings. In addition, they are sturdily built and do not have to be coddled.



2. Quickly Mounted or Altered

Their feet are machined accurately and drilled for standard mounting bolts. The reversible stator puts the roomy conduit box on the most convenient side and the end-shields can be rotated to any of four positions to meet mounting requirements.



3. Easy to Wire

A large, four-position conduit box gives unrestricted working space. It can be quickly removed for wiring. Flexible leads are pressed on the terminals which are permanently identified. No soldered connections are necessary. A stainless-steel, graphic connection plate is conveniently located on the conduit-box side of the motor.



4. Convenient to Lubricate

All Tri-Clad motors have a large oil or grease capacity. On sleeve-bearing motors, the oil-filler gage can be located on either side of the bearing housing. A spring cover on this gage permits quick checking of the oil level. On ball-bearing motors, a pressure-relief greasing system assures rapid and thorough greasing.



**BUILT FOR
PROTECTION
FIRST
... TO LAST**



Extra Protection 3 Ways

HELPS ASSURE LONG SERVICE LIFE

Production interruptions are avoided and operating time is saved when the motor you buy can stand up under the many adverse operating conditions commonly found in industry. Tri-Clad motors meet these conditions with—

1. Extra Protection against physical damage
2. Extra Protection against electrical breakdown
3. Extra Protection against operating wear

The new General Electric Tri-Clad motor is a cinch to install. Its convenience features pay off in precious minutes saved—both for those who build motors into machines and for those who use them in a plant.

Next time you order motors, take *time-saving* into account, along with protection and performance: make sure you get Tri-Clad motors—now available in a wide range of types and integral horsepower sizes to 20 hp.

Write for Bulletin GEA-3580 which gives full details about these extra protection features and other Tri-Clad motor advantages.

GENERAL  ELECTRIC

750 81-8054

PAPERBOARD PRODUCTION BY ZONES

1941

Short Tons

Zone.	Linters	Corr. Material	Chip	Folding Boxboard	Set-Up Boxboard	Other	Total
New England	41,700	11,700	11,000	208,900	72,000	126,300	471,600
Middle Atlantic	550,200	223,700	74,300	484,100	430,100	428,400	2,190,800
Lake States	617,800	438,400	171,500	810,100	164,800	510,700	2,713,300
South	1,141,200	348,300	17,500	44,900	24,500	166,900	1,743,300
Western	215,100	110,100	75,700	176,700	41,800	119,100	738,500
Total	2,566,000	1,132,200*	350,000	1,724,700	733,200	1,351,400	*7,857,500

*In addition, Canadian Imports of Corrugating Material were 106,200 tons.

Source: National Paperboard Association. Western group includes all states west of Mississippi River with the exception of Texas, which is included in the southern group.

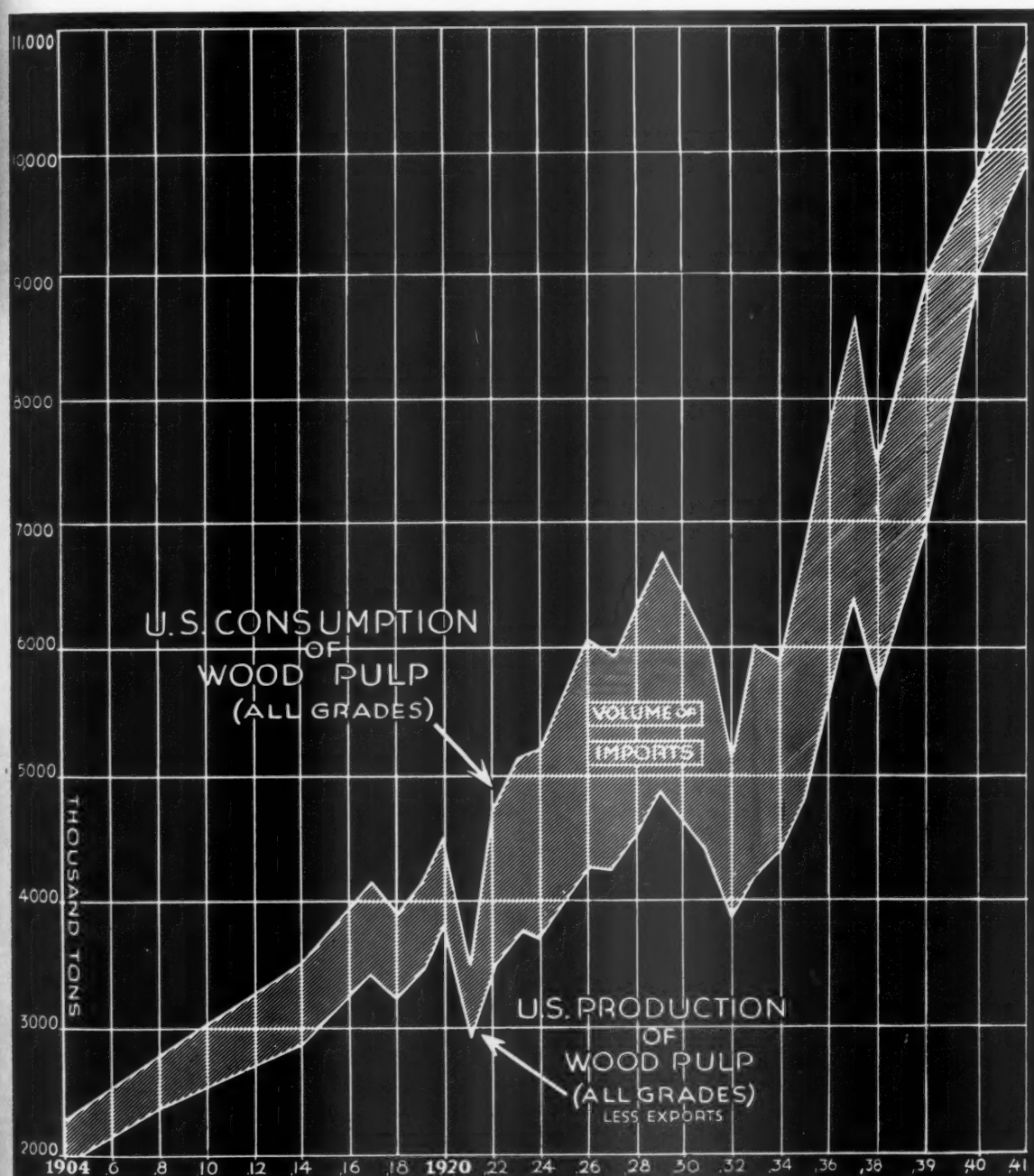


Table 1.—Paper and Paperboard—Production, by Kind and Quantity, for the United States: 1940, 1939, and 1938

Kind	Quantity (Short tons)		
	1940	1939	1938/
Aggregate.....	14,487,709	13,509,642	11,380,814
Newsprint, total.....	1,056,704	924,259	832,331
Standard, in rolls.....	1,028,840	925,897	2/632,331
Standard, in sheets, and other special grades.....	27,864	28,362	
Ground-wood printing and specialty papers, total.....	550,453	540,742	475,691
Hanging.....	142,278	116,781	87,176
Catalog.....	96,416	80,632	91,782
Novel-news and news-tablet.....	26,279	39,359	256,693
Poster and lining.....	28,570	33,372	
Rotogravure.....	148,396	106,121	
Other ground-wood papers.....	1/108,514	1/168,277	
Book paper, total.....	1,654,423	1,534,591	1/1,336,814
Machine-finished, sized, and supercalendered:			
Free from ground wood.....	896,119	1,022,120	1,336,814
Containing ground wood.....	218,279		
Converting paper:			
Body stock for coated paper:			
Free from ground wood.....	227,725	265,635	
Containing ground wood.....	1,897	9,374	
Other converting paper.....	137,697	51,744	1,336,814
Lithograph.....	32,644	41,449	
Offset.....	72,842	66,097	
Other book paper.....	60,870	28,132	
Cover paper.....	26,944	19,401	20,216
Text paper.....	11,065	12,339	(5)
Writing paper (fine), total.....	599,452	594,994	481,719
One-hundred-percent rag.....	12,143	13,420	69,468
Less than 100% to 50% rag.....	33,816	28,017	
Less than 50% rag.....	47,455	42,460	
Sulphite bond.....	364,288	384,054	304,282
Other chemical wood-pulp writing papers.....	141,750	146,643	107,969
Wrapping paper, total.....	2,500,818	2,238,993	1,855,856
Unbleached sulphite and semi-bleached sulphate:			
Butchers' and grocers' paper.....	138,252	140,952	(8)
Rag.....	11,772	(6)	
Machine-glazed wrapping.....	16,896	35,711	
Other grades.....	42,856	107,007	
Bleached sulphite and bleached sulphate:			
Waxing paper (18 lbs. and up).....	149,379	141,007	(8)
Rag.....	49,322	38,340	
Other grades.....	1/168,540	1/165,410	
Wrapping and envelope manila.....	25,042	19,131	
Greaseproof.....	21,653	18,328	1,216,030
Glassine.....	53,828	55,516	
Kraft wrapping:			
Machine-finished:			
Wrapping.....	475,479	398,580	(8)
Converting:			
Rag.....	717,163	615,365	
Other.....	296,507	178,144	
Machine-glazed:			
Wrapping.....	50,584	48,742	(8)
Converting (bag and other).....	43,962	42,603	
Logos and screenings.....	26,961	29,632	
Heavy (mill wrappers, etc.).....	46,155	37,352	
Rope and jute.....	17,307	22,740	12/649,826
Tagboard, light manila board, and pattern.....	43,302	49,008	
Other wrapping paper.....	2/105,860	2/97,625	
Tissue paper, total.....	761,712	665,723	548,943
High-grade tissue (cigarette, condenser, carbon, etc.).....	27,818	27,284	(11)
Waxing (up to 18 lbs.).....	35,865	39,147	
Wrapping tissue (up to 18 lbs.).....	67,970	56,263	
Toweling.....	155,754	129,105	
Toilet tissue.....	316,386	285,085	(11)
Napkin stock.....	73,191	70,098	
Pattern tissue.....	3,494	2,305	
Sales-book tissue.....	815	2,319	
Carpet twisting.....	12,100	7,305	179,612
Other tissue.....	68,319	56,802	

Bureau of the Census.

PAPERBOARD PRODUCTION BY ZONES

1940

Short Tons

Zone	Liners	Corr. Material	Chip	Folding Boxboard	Set-Up Boxboard	Other	Total
New England.....	25,500	4,700	7,600	163,500	62,600	69,600	333,400
Middle Atlantic.....	451,100	172,600	60,900	401,400	339,400	328,900	1,754,300
Lake States.....	445,300	361,200	132,800	662,100	140,600	424,700	2,166,700
South.....	874,300	286,800	13,400	38,900	17,500	211,600	1,442,500
Western.....	169,700	78,100	63,700	132,600	30,400	103,000	577,500
Total.....	1,965,900	903,400	278,400	1,398,500	590,500	1,137,800	6,274,400

Source: National Paperboard Association. The western group includes all states west of Mississippi River with the exception of Texas, which is included in the southern group.

business as usual" philosophy. Under this economy, business activity, industrial production and national income have reached record levels.

"Advices and news releases from Washington considered in connection with the turn of international events now indicate that "business as usual" is definitely on the way out. Shortages of essential materials and services on the one hand, with an expansion of our defense efforts to a degree which would have been considered fantastic a year or even six months ago on the other hand, indicate a serious restriction in all except defense and essential civilian industries is inevitable.

"So far these factors have had little restrictive effect on industry. Durable goods production (which is largely representative of the heavy defense industries) continues to climb to higher levels, while non-durable goods production is also at record highs but is beginning to show signs of leveling off.

"Paper manufacturers are undoubtedly aware of the serious effects that a wide-spread restriction of civilian industry activity may have on the future consumption of paper. Even assuming that increased defense demand for paper will make up for the probably reduced civilian demand, management is nevertheless under the obvious necessity of carefully evaluating conditions as they affect operations and formulating plans for the future to meet the exigencies of the rapidly changing situation."

New Factors

● The paper industry is being affected not only by the shrinkage of some of its markets and by the development of war created outlets, but it will also feel the effects of new factors entering into the wood pulp situation.

In buying wood pulp the paper industry has a new competitor, the government, which needs large tonnages of nitrating wood pulp for the production of smokeless powder. Cotton linters, the original basis of smokeless powder, are not available in sufficient volume to handle the greatly increased requirements, so wood pulp has been adopted as a major source of cellulose for nitration. At present the demand for nitration is running well over 100,000 tons annually and this figure will be considerably increased before the end of the year. Ultimate demand figures are not available but estimates from Washington run from 250,000 to 600,000 tons annually.

Whatever the nitrating demand may become the bleached sulphite pulp needed will be taken largely from the paper mills as further major expansion of production appears to be out of the question. Up to the present nitrating pulp has been supplied by the several companies best equipped to produce it but, with the demand rising rapidly, orders are being more widely distributed and a number of mills formerly making bleached sulphite pulps exclusively for paper are converting part of their facilities to make the highly purified pulp required.

The rayon industry is taking more pulp than ever before and very likely its needs will rise still more with the curtailment in the use of wool for civilian clothing. From the table on page 115 it will be noted that the rayon industry consumed 214,500 tons of wood pulp in 1941 as compared with 178,000 tons in 1940. This is an increase of 36,500 tons or 20.4 per cent. The increased consumption of wood pulp by the rayon industry last year is even more impressive when compared with the 145,000 tons used in 1939, a gain of 69,500 tons or 47.9 per cent. Part of this increase is due to the rise in viscose rayon production and part to the employment of wood pulp to a greater degree by the acetate division of the industry.

Cellulose plastics are also taking more wood pulp.

Lease-Lend shipments of wood pulp to Great Britain constitute an important part of our pulp production, the exact tonnage being unavailable for publication. Shipments to South American countries are also a factor.

In paper markets the changes are too numerous to attempt to record in full here. The effect of the war

on the writing paper industry has been outlined by Mr. M. C. Dobrow, executive secretary of the Writing Paper Manufacturers Association. He reports that at the close of 1941 the government agencies were taking 11 per cent of sulphite writing papers. It is more impressive, he states, when broken down into grades. Some 25 per cent of the mimeograph paper was being consumed by the government and expectations were that the percentage would increase to 40 or 50 per cent of the total output. More than 20 per cent of the meter and chart paper was going directly to the government and this would probably expand.

The rag content producers have found themselves selling about 40

per cent of their production to the government. In such specialized papers as blueprint, the purchases of the government and war plants only are estimated by Mr. Dobrow to exceed 80 per cent of domestic production. Of the rag manifold papers 57 per cent went to the government as did more than 30 per cent of the rag content bonds.

The report of Mr. E. R. Gay, vice president of the St. Regis Paper Company and president of the Kraft Paper Association, contains this illuminating remark:

● "Had it not been for the substantial increase in productive facilities which had been accomplished since 1936, the industry would have fallen far short of meeting the de-

Table 1.—Paper and Paperboard—Production, by Kind and Quantity, for the United States: 1940, 1939, and 1938—Continued

Kind	Quantity (Short tons)		
	1940	1939	1938 ¹
Absorbent paper, total.....	129,410	121,717	126,320
Blotting.....	9,993	10,693	
Filter.....	2,625	1,905	
For vulcanized fiber.....	18,493	13,647	
For parchmentizing.....	24,664	(12)	
Other absorbent paper ²	73,645	95,872	
Building paper, total.....	682,460	659,090	570,454
Sheathing paper.....	43,629	44,408	
Felts.....	589,165	567,866	
Asbestos-filled and asbestos paper.....	44,655	42,615	
Other building paper.....	5,011	4,201	
Other paper.....	60,120	63,625	58,743
Boards, total.....	6,449,548	6,104,968	5,103,767
Container boards:			
Liners:			
Kraft.....	1,461,399	1,395,523	
Jute.....	788,800	819,654	
Other.....	53,635	137,968	
Chip (plain and test).....	441,428	450,995	2,631,318
Straw (for corrugated-container use).....	437,782	399,189	
Other container boards.....	253,790	168,112	
Folding boxboards (bending):			
Manila-lined (all lined boards).....	698,168	784,725	
Patent-coated.....	387,894	262,029	1,221,047
Other folding boxboards.....	330,390	313,207	
Set-up boxboards (nonbending):			
Chip and straw.....	385,142	414,335	
Newsboard.....	299,037	251,959	608,867
Other (including tube, egg-case, etc.).....	214,370	199,191	
Binder's board.....	65,606	28,054	34,241
Cardboard:			
Blanks and miscellaneous.....	25,138	21,911	
Clay-coated cardboard.....	23,450	31,669	47,371
Photomounts and other cardboard.....	5,195	5,294	
Bristol board:			
Index.....	31,070	28,782	
Mill (including specialties).....	32,830	45,429	52,223
Uncoated postcard.....	6,574	5,263	
Leatherboard.....	15,706	25,714	18,355
Pressboard.....	9,443	7,619	10,199
Building boards:			
Wallboard.....	42,748		
Insulating.....	112,004	114,505	118,124
Other.....	24,691		
Other boards.....	345,258	203,841	362,022

¹ The questionnaires used for collecting data for 1938 were in less detail than those used for subsequent years; hence the figures are not strictly comparable in all cases.

² "Standard, in rolls and sheets," 828,267 tons; "Other, special grades," 4,064 tons.

³ Includes data for "Printing" paper, not shown separately to avoid disclosing figures for individual establishments.

⁴ Reported as "Book paper, uncoated."

⁵ Included with "Book" paper.

⁶ Included with "Other grades"; not shown separately to avoid disclosing figures for individual establishments.

⁷ Includes data for "Machine-glazed wrapping" paper; not shown separately to avoid disclosing figures for individual establishments.

⁸ Not called for separately, included with "Other wrapping paper."

⁹ Includes data for "Vegetable and other imitation parchment"; not shown separately to avoid disclosing figures for individual establishments.

¹⁰ Includes figures for items covered by footnote 8.

¹¹ Not called for separately, included with "Other tissue."

¹² Combined with "Other absorbent paper," to avoid disclosing figures for individual establishments.

¹³ Includes data for "Matrix paper and board"; not shown separately to avoid disclosing figures for individual establishments.

Bureau of the Census.

Table 2.—Paper and Paperboard—Production, by Quantity,
by States: 1940, 1939, and 1938

¹/This table shows, by States, the output for which separate figures can be given without disclosing the production of individual establishments.

State	Quantity (Short tons)		
	1940	1939	1938
United States.....	14,483,709	13,509,642	11,380,814
California.....	329,082	294,846	242,533
Connecticut.....	174,496	168,729	160,272
Delaware.....	29,777	14,843	35,314
Florida.....	392,003	370,778	273,048
Illinois.....	610,769	571,589	515,227
Indiana.....	252,435	267,056	183,547
Louisiana.....	753,752	593,902	468,808
Maine.....	1,073,039	1,034,976	882,171
Maryland.....	161,709	155,525	131,993
Massachusetts.....	518,764	519,459	439,499
Michigan.....	1,239,381	1,225,977	1,011,789
Minnesota.....	300,563	301,774	246,722
New Hampshire.....	169,059	166,211	140,739
New Jersey.....	780,151	740,691	626,274
New York.....	1,455,573	1,386,857	1,178,912
North Carolina.....	154,232	128,022	111,709
Ohio.....	997,867	961,265	827,340
Oregon.....	310,870	260,402	234,879
Pennsylvania.....	987,650	916,152	759,121
Texas.....	71,037	(1)	(1)
Vermont.....	77,046	83,298	70,700
Virginia.....	577,625	510,844	412,650
Washington.....	600,180	552,577	472,185
West Virginia.....	51,825	55,897	51,334
Wisconsin.....	1,072,150	1,010,974	882,445
Other Southern States ²	1,035,068	943,968	798,267
Other States ³	307,606	273,030	223,336

¹/ Included in figure for "Other Southern States."

²/ For all years: Alabama, Arkansas, Georgia, Mississippi, South Carolina; in addition, Texas for 1939 and 1938.

³/ For all years: District of Columbia, Iowa, Kansas, Missouri, Rhode Island; Tennessee: in addition, Colorado for 1938 only.

mands placed upon it during the year. The rapidly advancing defense program called for large quantities of kraft paper, in addition to a considerably increased civilian demand.

"Kraft, the strongest of all papers made from wood pulp, has become a necessity to virtually all of the industries contributing to the war effort. There is no satisfactory substitute for kraft paper as a wrapping or packaging material. In addition, kraft paper is required for condensers, for interleaving steel plates, for the waterproof paper which goes in shell cases, to name only a few of its essential war uses.

"Furthermore, substantial quantities of kraft paper are now being required for the manufacture of heavy duty bags to replace the burlap formerly used as containers for agricultural and chemical commodities. Burlap imports have been restricted as a result of the war in the Far East and, of the amount remaining available in this country, a high percentage will be required for sandbags and other military purposes."

Paperboard is in heavy demand by the government and war industries and despite the gradual shrinking of its use for packaging certain civilian products such as electrical appliances, refrigerators, washing

Bureau of the Census.



Official U. S. Navy Photograph.

LETTERS FROM HOME / / / A double reminder—to write friends and relatives in the armed forces, and of this important function of paper in war time.

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All of the above services are available through the nearest Westinghouse office. A phone call will bring you any one or all of them. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

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machines, etc., the need for paper-board is increasing and production is keeping up. All container board production in the first 16 weeks of 1942 showed an increase over the same period in 1941 of 16.4 per cent. All boxboard production was up 18.5 per cent in the same period. Container chip board showed the largest increase in the 16-week period, being up 43.5 per cent.

"On the other side of the picture," said Mr. Charles E. Nelson, president of the National Paperboard Association and of the Mac Sim Bar Paper Company, in his report to the National Paperboard Association members at their meeting May 8, 9, 1942, "experience is showing that many former users of tin and other containers made of critical materials have been forced to

seek other types, and that paperboard containers (i. e., fiber cans, folding boxes, set-up boxes, corrugated and solid fiber boxes) are being made available to replace other types of containers for the packaging of many articles."

"The prediction was made," states the report of the meeting, "that within a reasonable period, the fabricators of paperboard will develop suitable paperboard packages to replace various containers made of critical materials.

"It was generally felt that the loss of business resulting from the curtailment of orders will be largely offset by a gain in business incident to increased use of paperboard packages in these new fields.

"A report submitted at the meeting indicated that there are definite indications that the government will use appreciably larger quantities of paperboard containers and that the government prefers the fiber box wherever it will stand up properly in the service in which it is to be used, and that this preference is based upon the following facts:

"1. For the same shipping unit the fiber box is smaller than any other type of container, and thus a larger quantity of goods in fiber can be loaded in a ship, than is the case when other types of boxes are used—thus fewer ships are required.

"2. Fiber boxes are readily obtainable in any quantities likely to be needed.

"3. Fiber boxes contain a minimum of 'critical' material.

"4. Fiber boxes are generally less expensive than other types.

"Reports were submitted at the meeting showing progress to date in the development of corrugated boxes suitable for the requirements of the armed forces overseas shipments. Samples of two corrugated boxes of special types developed for overseas shipments were exhibited and described. It was also reported that many thousands of special solid fiber boxes are now being used for important overseas shipments for our armed forces."

The paperboard industry, along with the pulp and the paper divisions is putting its shoulder to the wheel in the unified effort of all Americans to help in every way to win the war.

Table 3.—Paper Machines, by Type, Number, and Capacity, and by Kind of Paper Made: 1940, 1939, and 1938

Kind of paper made	Total capacity per year of 310 days (Short tons)	Fourdrinier		Cylinder	
		Number	Capacity per 24 hours (Short tons)	Number	Capacity per 24 hours (Short tons)
Total:					
1940.....	16,890,970	902	31,514	699	22,973
1939.....	16,557,410	885	30,383	684	23,028
1938.....	16,191,300	885	29,616	690	22,614
Newsprint:					
1940.....	1,075,080	47	3,468	—	—
1939.....	988,280	40	3,188	—	—
1938.....	960,380	42	3,098	—	—
Ground-wood printing and specialty papers (hanging, catalog, novel-news, news-tablet, etc.):					
1940.....	617,830	50	1,989	2	4
1939.....	631,470	56	2,033	1	4
1938.....	597,060	54	1,926	—	—
Book paper:					
1940.....	1,959,820	200	6,308	2	14
1939.....	1,936,260	210	6,242	1	4
1938.....	1,977,490	216	6,374	1	5
Cover and text papers:					
1940.....	50,220	7	153	2	9
1939.....	30,070	5	93	1	4
1938.....	65,100	11	205	2	5
Writing paper:					
1940.....	728,190	136	2,344	1	5
1939.....	747,100	134	2,379	4	31
1938.....	676,110	132	2,181	—	—
Wrapping (or coarse) paper:					
1940.....	2,840,220	212	8,632	36	530
1939.....	2,609,580	214	7,898	37	520
1938.....	2,503,560	200	7,596	40	480
Tissue paper:					
1940.....	839,790	147	2,194	93	515
1939.....	792,980	125	1,882	92	676
1938.....	668,980	114	1,732	70	426
Absorbent paper:					
1940.....	186,000	40	570	12	30
1939.....	165,850	36	495	16	40
1938.....	188,170	48	541	24	66
Building paper:					
1940.....	958,210	6	365	67	2,726
1939.....	938,370	8	377	61	2,650
1938.....	890,010	7	351	71	2,520
All other papers:					
1940.....	81,640	12	168	8	96
1939.....	86,490	12	181	10	98
1938.....	128,650	14	290	13	125
Boards:					
1940.....	7,553,770	45	5,323	476	19,044
1939.....	7,630,960	45	5,615	461	19,001
1938.....	7,535,790	47	5,322	469	18,987

1/ Equipment for "Text" paper included in "Book" paper.

Bureau of the Census.

Note: Paper-making machines. The distribution of machines by number as given in Table 3 above, is based on the general or usual output of these machines. In cases where one or more machines of the same type are used for producing two or more kinds of paper or board, the distribution by capacity has been made according to the several kinds of paper manufactured. To illustrate: If a mill operated two fourdrinier machines and if 80 per cent of this mill's output was "Newsprint" and the remaining 20 per cent was reported as "hanging paper," both machines were classified in the "Number" column of the table as "Newsprint," but 80 per cent of their capacity was assigned to "Newsprint" and 20 per cent to "hanging paper."

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Newsprint in 1941

● Newsprint paper production in North America really reached a new high mark in 1941 although this does not appear on first glance at the statistics, according to the annual report of Royal S. Kellogg, secretary of the News Print Service Bureau. True, it was 2,000 tons more than in 1940, but the output of 4,786,000 tons was 158,000 tons less than the record output of 4,944,000 tons in 1937. However, as heretofore emphasized, the 1937 production was altogether abnormal and not related to consumption during the same twelve months. A large tonnage went to increase publishers' stocks in 1937. This together with a smaller consumption and a decrease in overseas exports in 1938 resulted in a decrease of 1,231,000 tons in 1938 production.

A true comparison of 1941 production is with the average production of 4,329,000 tons in 1937-38 which gives the 1941 total an edge of 457,000 tons over that of three to four years earlier. The most accurate statement that can be made is that output of newsprint paper in North America in 1940 and 1941 was at an all-time high for a 24-month period.

The newsprint mills began 1942 at practically capacity operation either upon

newsprint or other products which they are capable of manufacturing. This is also true of other paper mills.

The 4,786,000 tons of newsprint produced in North America in 1941 was in round numbers made to the extent of 72 per cent in Canada, 21 per cent in the United States and 7 per cent in Newfoundland. These totals were 7,000 tons more in Canada than in the preceding year, 1,500 tons more in the United States and 6,300 tons less in Newfoundland, making a net increase of only 2,200 tons over 1940.

Shipments from the mills during the year exceeded production by 37,000 tons with a corresponding decrease of mill stocks as of December 31, 1941. As of that date mill stocks were the lightest of any December 31 since 1937.

Exports

● Exports of newsprint paper from Canada are reported by Ottawa to have had a monetary value of \$154,356,000 in 1941. This was the largest export item in Canada's greatest year in export history with the exception of \$161,856,000 for wheat. Moreover, newsprint contributed 9.5 per cent to the total value of \$1,621,-

000,000 of Canada's export trade last year.

The Dominion Bureau of Statistics reports that there were in round numbers 3,262,000 tons of newsprint exported from Canada in 1941, of which 500,000 tons went overseas and 2,762,000 tons to the United States.

Overseas newsprint exports from Canada, due to war restrictions and hazards, were 24 per cent less in 1941 than in 1940 but were 4 per cent greater than the ten-year average, and to the United States 26 per cent greater than that average. Total exports of newsprint from Canada in 1941 were 95 per cent of production. The ten-year average was 93.5 per cent.

Exports of newsprint from Newfoundland to all destinations amounted to 346,226 tons in 1941 and to 367,174 tons in 1940.

No monthly reports of imports or exports of any commodity into or out of the United States have been released since those for September, continues Mr. Kellogg, and so far the Department of Commerce has been adamant to all requests for such figures during the time

U. S. Newsprint Industry's Share of Domestic Market Decreased Slightly in 1941

United States newsprint mills supplied 24.5 per cent of the total newsprint available for consumption in the country in 1941 as compared with 25.9 per cent in 1940, a decline of 1.4 per cent. In 1939 U. S. Mills supplied 26.1 and in 1938 27.3 per cent.

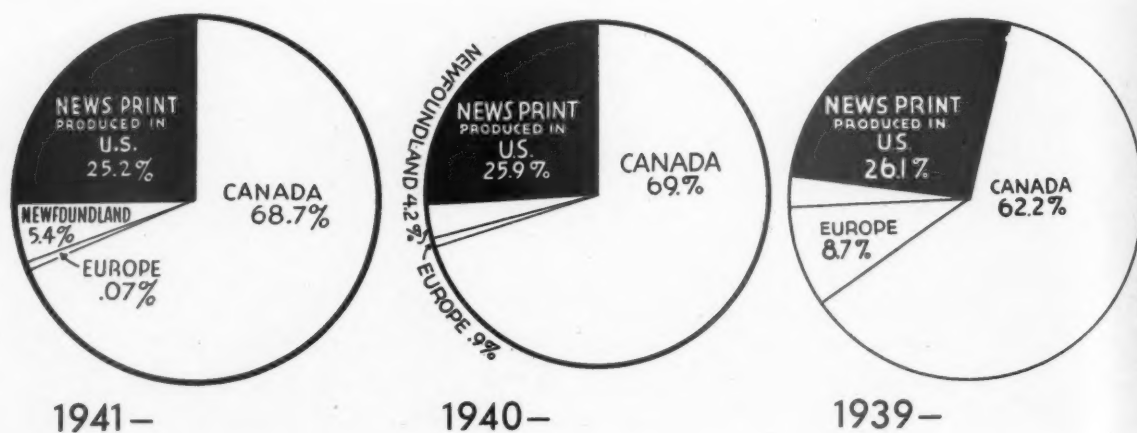
Each circle represents the total amount of newsprint in the United States available for consumption in that year, with the percentage of consumption supplied by domestic production and imports.

From 1915 through 1937 the percentage of the domestic market supplied by U. S. newsprint producers declined from 76.3 per cent in 1914 to 22 per cent in 1937.

In 1938 the trend was reversed and American producers furnished 27.3 per cent of the country's newsprint consumption despite the fact that domestic production was the lowest in 35 years. The gain was due to the greater percentage reduction in newsprint imports than in domestic production. U. S. newsprint production in 1938 was a little less than half the production in 1926.

U. S. newsprint production in 1941 was 45,000 tons greater than in 1940 and the latter year's production was 58,741 tons larger than the 1939 production. The 1941 production went over a million tons for the second time since 1932. Exports of 73,000 tons in 1941 are said to be misleading as paper other than standard newsprint was included and the News Print Service Bureau estimates that actual standard newsprint exports probably did not exceed 25,000 tons.

Total newsprint available for consumption in the U. S. in 1941 was 4,015,000 short tons against 3,746,000 short tons in 1940.



the United States is at war. In this respect Washington is much less accommodating than Ottawa with information helpful to domestic industry and harmful to no essential cause.

For the first nine months of 1941 the Department of Commerce reported a total of approximately 55,000 tons of newsprint paper exported from the United States. If this ratio held during the rest of the year, the 1941 aggregate would approximate 73,000 tons and constitute the largest official record of newsprint exports in any one year since 1919. However, these figures are deceptive so far as exports of standard newsprint from the United States are concerned, since the classification of "newsprint" in export declarations includes fourteen related items in addition to standard newsprint.

The reports of all the manufacturers of newsprint paper in the United States to the News Print Service Bureau indicate that they exported about 25,000 tons of standard newsprint paper in 1941, and this figure is consequently the one used in estimating the domestic consumption of newsprint.

Consumption

• The publishers reporting to the American Newspaper Publishers Association used, in round numbers, 2,947,000 tons of newsprint in 1941, an increase of 91,000 tons or 3.2 per cent over their consumption in 1940.

This gain in publishers' consumption was better than it seemed would be the case earlier in the year, since in June and in September there were no increases over the same months in 1940 and in May and October the increase was only 1 per cent.

December came along with the largest monthly gain of the year—7 per cent—due to the great demand for newspapers following the official entry of the United States into World War II. Papers contained more news and circulations jumped, temporarily at least.

But the increase in consumption reported by the publishers does not tell the whole North American newsprint story. The production of 4,786,000 tons plus 3,000 tons imported from overseas early in the year and the known decrease of 37,000 tons in mill stocks make a continental total of 4,826,000 tons of newsprint which went somewhere. Using industry figures because of the lack or insufficiency of official United States data, the accompanying computation appears reasonable.

North American Newsprint—1941

Supply	Tons
Production	4,786,000
Overseas Imports	3,000
Decrease in Mill Stocks	37,000
Total	4,826,000
Distribution	
U. S. Overseas Shipments	25,000
Newfoundland Overseas Shipments	129,000
Canadian Overseas Shipments	488,000
Canadian Domestic Shipments	197,000
Newfoundland Domestic Shipments	1,000
Increase in Publishers Stocks	56,000(?)
United States Consumption	3,930,000(?)
Total	4,826,000

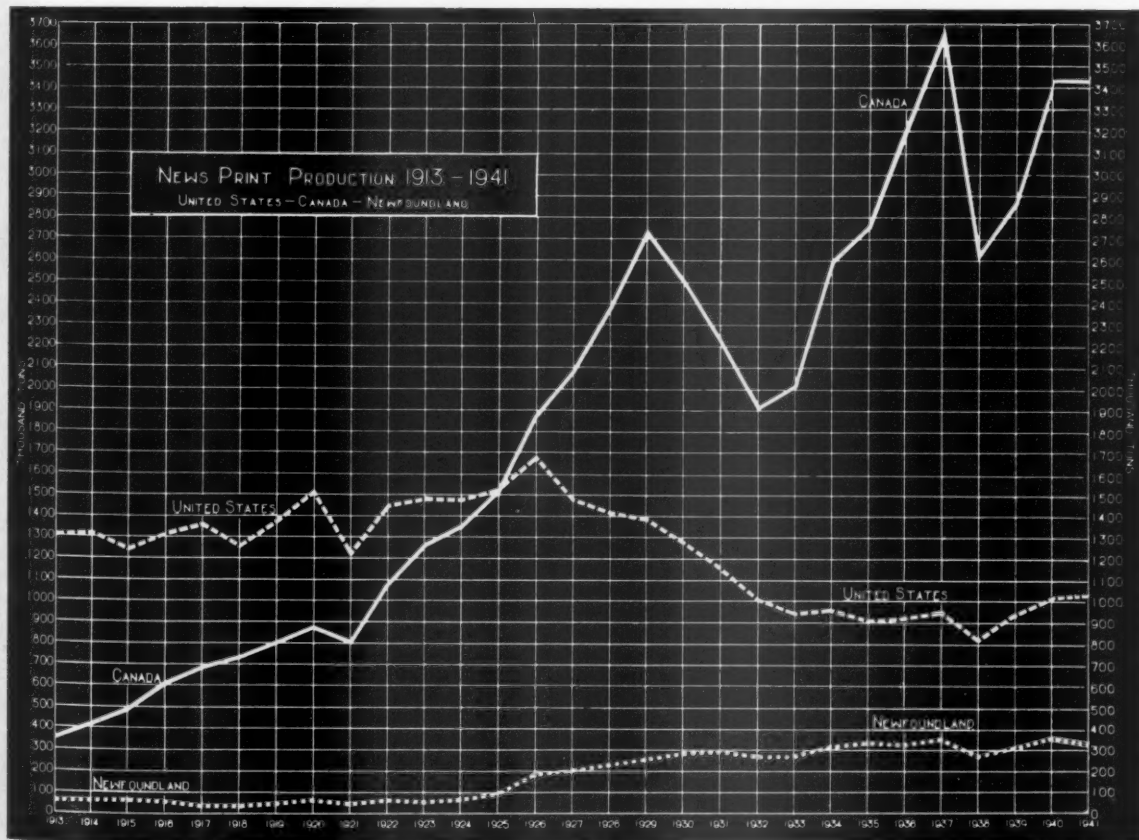
Lacking information from Canadian publishers as to their consumption, it is necessarily assumed that it was approximately in the same volume as Canadian



1925—



1915—



News Print Service Bureau.



PORT ALICE, B. C.

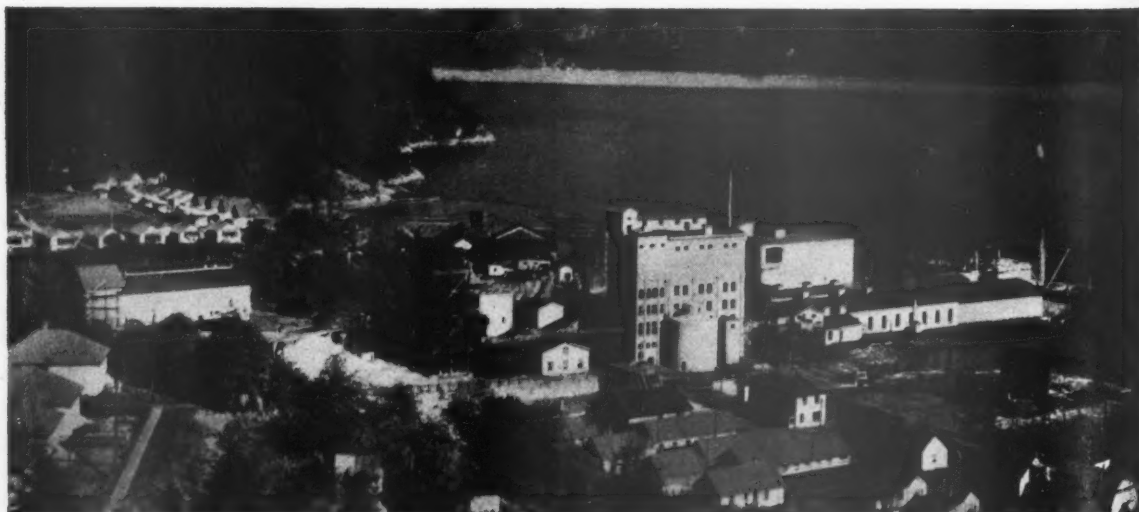
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domestic shipments. The estimate of 3,930,000 tons United States consumption in this calculation is 200,000 tons more than the consumption in 1940 and 100,000 tons more than the previous high total of 3,830,000 tons in 1937. If, however, the newspaper publishers in the United States, as shown by their reports, used only 3.2 per cent more newsprint than in the preceding year, there was evidently a larger increase in paper used for other purposes than strictly newspaper publishing. This is a reasonable assumption because it is known that the strong demand for paper of every kind and the threatened shortage of some kinds have led to a greater use than normal of newsprint outside the printing field. The best estimates are also to the effect that around 100,000 tons of standard newsprint paper were used last year in the production of publications of the shopping news type. This is not an insignificant item.

Notwithstanding last year's record-breaking tonnage consumption of newsprint paper in the United States which occasioned a 2.4 pounds per capita increase over the preceding year, the 1941 per capita of 59 pounds was slightly below the corresponding figure in 1937 and 3.2 pounds below the all-time high reached in 1929.

Outlook

• The outlook for newsprint paper in 1942 cannot be discussed separately from the world war program. Newsprint pa-

per is less likely to be affected by that program than are some other grades of paper. A good deal of public control has already been imposed on some grades. If, when and how such control will be imposed upon newsprint is still a matter of speculation. If Government decides that such control is necessary, it is likely to be imposed regardless of opinion in the industry. There is enough newsprint manufacturing capacity in North America to supply all visible domestic and foreign demand if it is allowed to operate.

There were 40 cases of newspaper suspensions in 1940-41 and 20 cases of newspaper mergers, according to the records of Editor & Publisher. On the other hand, the disappearance of several small newspapers is more than compensated for in the newsprint consumption field by the appearance of a new metropolitan daily like the Chicago Sun whose requirements are large.

Another factor of some importance in the quantity of newsprint consumed is the evidence that less rotogravure paper will be used and that its place will be taken to a considerable extent by newsprint of slightly better grade than the general standard—but still newsprint.

With the general tightness in the paper situation somewhat more newsprint may also be taken in 1942 for other purposes than newspaper publishing. These items are all on the good side so far as the manufacturers of newsprint are concerned. If there is an increase in the to-

tal use of newsprint in 1942, it will probably be due to these factors.

On the less cheerful side is the practical certainty that freight rates will be horizontally advanced between 5 and 10 per cent around March 1, thus adding materially to the delivery costs of paper. There is also the more distant prospect that whatever income may be earned by corporations and individuals in 1942 will thereafter be taxed perhaps 30 per cent more than at the present time.

There is no way of forecasting how much production costs may be increased by the end of 1942. The only certainty is that the longer the war goes on the more they will go up despite all governmental efforts to hold down prices. The best that can be hoped for in that respect is that price increases will be moderate and gradual rather than spasmodic and excessive. The gap between newsprint and general commodity prices is widening rapidly.

Pulp, Paper Expand B. C. Forest Income

• Complete figures have not yet been tabulated, but it is known that increasing production and revenue of the pulp and paper mills contributed substantially to a new all-time record for British Columbia forest industries in 1941.

Value of production of the forest industries last year was estimated at \$120,000,000, or about \$18,000,000 greater than in the previous year, which had set the high mark up to that time.

SOURCES OF NEWSPRINT USED IN THE UNITED STATES

(Tons in Round Numbers)

Source: News Print Service Bureau

	U. S. Production	U. S. Exports	Canada	Imports into the U. S. From Newfoundland	Europe	Available for Consumption
1913	1,305,000	43,000	219,000	-----	1,000	1,482,000
1914	1,313,000	61,000	310,000	-----	5,000	1,567,000
1915	1,239,000	55,000	367,000	-----	1,000	1,552,000
1916	1,315,000	76,000	468,000	-----	-----	1,707,000
1917	1,359,000	94,000	558,000	-----	1,000	1,824,000
1918	1,260,000	97,000	596,000	-----	-----	1,759,000
1919	1,375,000	111,000	628,000	-----	3,000	1,895,000
1920	1,512,000	49,000	679,000	1,000	50,000	2,193,000
1921	1,225,000	17,000	657,000	-----	135,000	2,000,000
1922	1,448,000	26,000	896,000	-----	133,000	2,451,000
1923	1,485,000	16,000	1,109,000	-----	200,000	2,778,000
1924	1,481,000	17,000	1,197,000	4,000	156,000	2,821,000
1925	1,530,000	23,000	1,295,000	20,000	133,000	2,955,000
1926	1,684,000	19,000	1,658,000	94,000	100,000	3,517,000
1927	1,486,000	12,000	1,776,000	89,000	122,000	3,461,000
1928	1,418,000	11,000	1,926,000	114,000	116,000	3,563,000
1929	1,392,000	19,000	2,195,000	132,000	96,000	3,796,000
1930	1,282,000	10,000	1,989,000	156,000	134,000	3,551,000
1931	1,157,000	10,000	1,754,000	160,000	151,000	3,212,000
1932	1,009,000	8,000	1,533,000	114,000	144,000	2,793,000
1933	946,000	11,000	1,545,000	95,000	153,000	2,728,000
1934	961,000	23,000	1,956,000	107,000	147,000	3,148,000
1935	912,000	23,000	2,062,000	124,000	197,000	3,272,000
1936	921,000	15,000	2,422,000	87,000	243,000	3,658,000
1937	946,000	17,000	2,899,000	124,000	294,000	4,246,000
1938	820,000	6,000	1,938,000	94,000	243,000	3,089,000
1939	954,259	13,000	2,206,000	104,600	310,000	3,561,859
1940	1,013,000	44,000*	2,586,000	157,000	34,000	3,746,000
1941**	1,058,000	73,000*	2,762,000	217,000	3,000	4,015,000

*Includes paper which is not standard newsprint. Standard newsprint exports from the U. S. during 1940 did not exceed 15,000 tons; during 1941 the exports did not exceed 25,000 tons.

**All 1941 figures estimated by the News Print Service Bureau.

Pulp Imports Down — Paper Imports Up in 1941

Import data available for 9 months of 1941, balance estimated ✓ ✓ ✓ Export data available for first 3 months ✓ ✓ ✓
Wood pulp imports drop 79,632 tons or 6.5% (estimated)
while Newsprint imports rose 205,000 tons or 7.4%.

ACTUAL import and export figures for 1941 are not available for publication because of the war. The Department of Commerce ceased issuing reports on exports at the end of the first quarter and on imports at the end of the third quarter, September.

However, fairly close estimates on wood pulp imports and exports for the final quarter of the year have been made by the United States Pulp Producers Association and are included in this issue. They will be found in the Association's charts which include wood pulp consumption, production, capacity, sales, imports and exports.

Official nine months' data on imports are shown in the table on page 101.

Wood pulp imports, all grades, in 1940 totaled 1,224,632 tons. Last year 811,079 tons were imported in nine months and the estimate for the entire year is 1,145,000 tons. Using the latter figure, the decline in imports in 1941 from 1940 was 79,632 tons or 6.5 per cent. Chemical pulp imports in 1940 were 1,053,119 tons and it is estimated that the imports of these grades last year amounted to 491,000 tons, a decline of 112,119 tons or 10.6 per cent.

Mechanical pulp imports in 1940 totaled 171,513 tons, but it is estimated that this grade accounted for 204,000 tons in 1941, a gain of 32,487 tons or 18.7 per cent.

Bleached sulphite pulp imports in 1940 were 352,916 tons while the estimates for 1941 are 389,000 tons, an increase of 36,084 tons or 10.2 per cent. Of the 1940 total 113,945 tons were rayon grades and 238,971 tons were paper grades. Last year the estimated rayon bleached sulphite imported was 122,000 tons, a gain of 8,055 tons or 7 per cent. Paper grade bleached sulphite imports last year were estimated at 267,000 tons, an increase of 28,029 tons or 11.7 per cent over 1940.

Unbleached sulphite pulp imports in 1941 were estimated at 351,000 tons as compared with actual imports of this grade in 1940 of 380,913 tons, a decline of 29,913 tons or 7.6 per cent.

Sulphate pulp imports totaled 176,000 tons according to the United States Pulp Producers Association estimates, while 1940 imports were 308,464, a decline of 132,464 tons or 42.8 per cent. Bleached sulphate imports were estimated at 60,000 tons against 1940 imports of 84,887 tons, down 24,887 tons or

28.5 per cent. Unbleached sulphate pulp imports were estimated for 1941 at 116,000 tons. This was 107,577 tons or 48 per cent less than the 223,577 tons imported in 1940.

Soda pulp imports last year were estimated at 17,000 tons or 6,237 tons, 58 per cent, more than the 10,763 tons imported in 1940.

Newsprint Imports

● Newsprint imports last year totaled approximately 2,982,000 tons or 205,000 tons more than the imports of 2,777,000 tons in 1940. Imports from Canada of 2,762,000 tons were 176,000 tons, 7 per cent, higher than the 2,586,000 tons imported in 1940. Newsprint imports from Newfoundland in 1941 rose to 217,000 tons from 157,000 tons, a gain of 60,000 tons, 40 per cent. Imports from Europe dropped from 34,000 tons in 1940 to 3,000 tons in 1941.

Besides the imports of newsprint from Canada in 1941 the United States took a large tonnage of .009 corrugating sheet made by the Canadian news mills of groundwood and sulphite. This product was hurriedly produced to aid in supplying the sudden demand on the American board industry, and took up much of the remaining slack in Canadian news mills. The exact tonnage imported is unavailable. It is understood that the importing of this grade has declined in 1942 due to the high collections of waste paper in the United States.

Pulp Exports

● According to the United States Pulp Producers Association estimates exports of wood pulp amounted to 322,177 tons in 1941. This was 158,185 tons, 32.5 per cent below the 480,362 tons exported in 1940. Chemical pulp exports last year totaled around 317,177 tons and groundwood amounted to about 5,000 tons. No groundwood was exported in 1940.

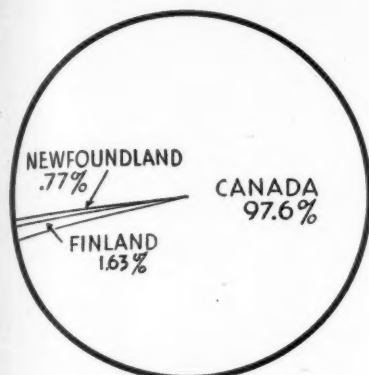
Bleached sulphite exported last year amounted to 112,000 tons of which 78,000 tons or 70 per cent, were paper grades, and 34,000 tons

INCREASES IN PACIFIC COAST MILL CAPACITIES 1941-1942

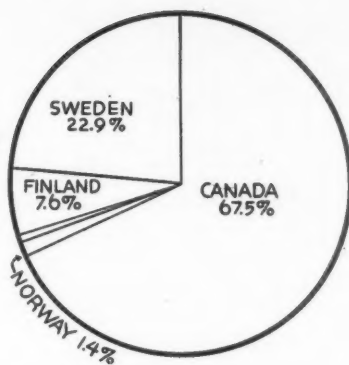
Revision of the DAILY CAPACITIES TABLES on Page 34 and 35, revealed the following expansion reported by the mills in the year from May, 1941, to May, 1942:

Unbleached Sulphite Pulp.....	255 tons per day
Bleached Sulphite Pulp.....	150 " " "
Sulphate Pulp (Bleached and Unbleached).....	180 " " "
Groundwood Pulp	56 " " "
Total Increase in Pulp.....	641 tons per day
Sulphite Papers	61 tons per day
Sulphate Papers	20 " " "
Newsprint Paper	49 " " "
All Others	89 " " "
Total Increase in Paper.....	121 tons per day

Rated paperboard productive capacity remained unchanged.



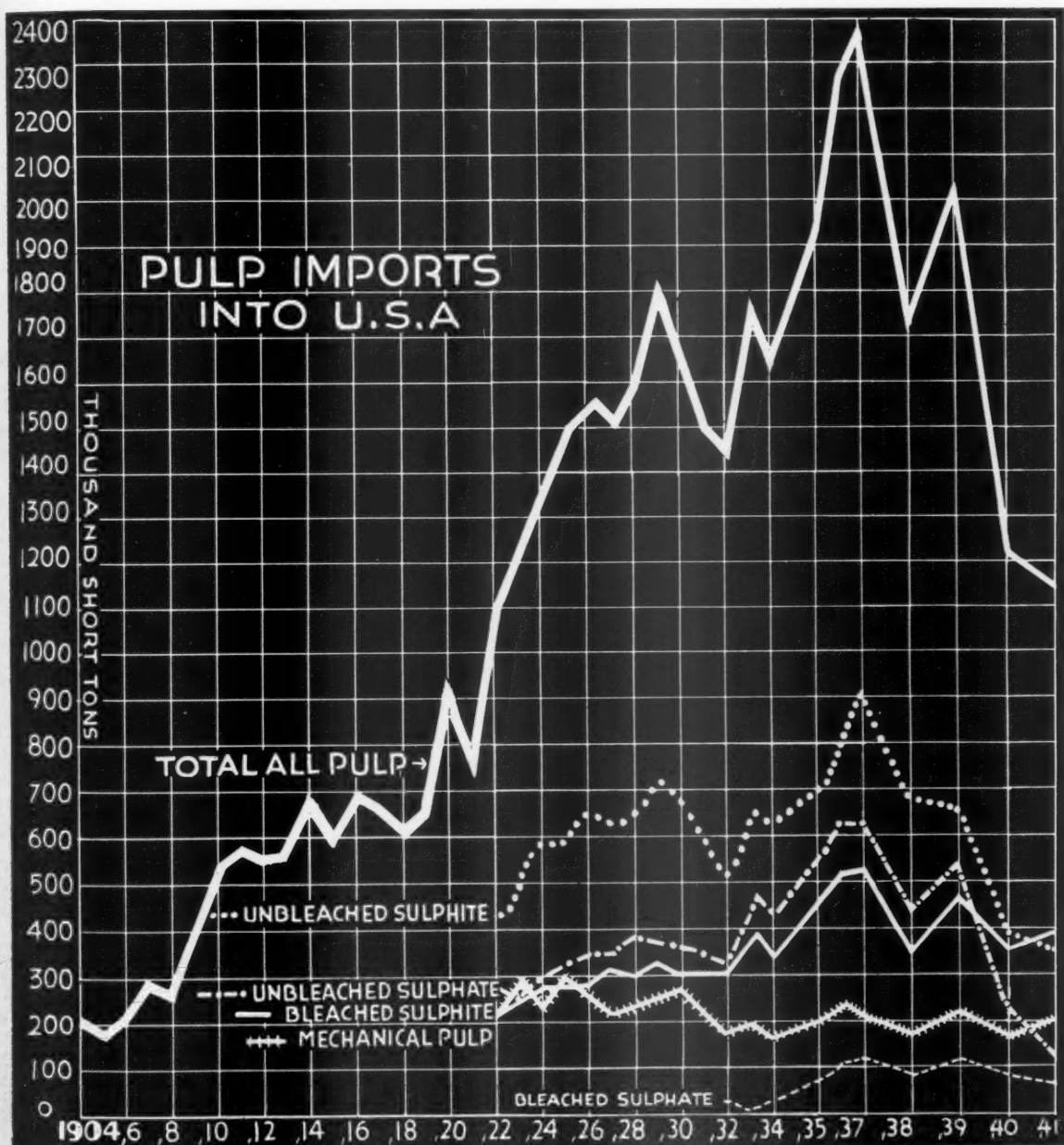
97.6% of 1941 U. S. Pulp Imports From Canada.



99.4% of 1940 U. S. Pulp Imports From Four Countries.



97% of 1939 U. S. Pulp Imports From Five Countries.





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NEW YORK CITY

UNITED STATES

Wood Pulp Imports by Grades and Countries of Origin

Nine Months of 1941¹

(Short Tons)

Grade	Canada		Newfoundland and Labrador		Finland		Others		Total	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Mechanical Wood Pulp										
Unbleached	136,101	\$ 3,705,340	653	\$ 19,620					136,759	\$ 3,724,960
Bleached										
Total	136,101	\$ 3,705,340	653	\$ 19,620					136,759	\$ 3,724,960
Sulphite										
Unbleached	235,327	\$12,367,662	5,568	\$ 313,277	5,748	\$ 365,896			*246,643	\$13,046,835
Bleached										
Rayon	86,105	7,173,086							86,105	\$ 7,173,086
Other	196,296	13,139,056			836	53,245			197,132	\$13,192,301
Total	517,728	\$32,679,804	5,568	\$ 313,277	6,584	\$ 419,141			529,880	\$33,412,222
Sulphate										
Unbleached	82,567	\$ 4,745,110			5,965	\$ 382,510			88,532	\$ 5,127,620
Bleached	44,139	3,557,833			661	46,000			44,800	3,603,833
Total	126,706	\$ 8,302,943			6,626	\$ 428,510			133,332	\$ 8,731,453
Soda										
Other Grades	11,011	\$ 664,414							11,011	\$ 664,414
Total	791,550	\$45,353,856	6,221	\$ 332,897	13,210	\$ 847,651	93	\$ 22,089	811,079	\$46,556,513

Note: No imports from Norway or Sweden during 1941.

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

¹Includes 5,228 tons of Screenings valued at \$93,337.²The United States Pulp Producers Association estimates imports for the full year 1941 as follows: Mechanical, 204,000 tons; Total Sulphite, 740,000 tons; Bleached Sulphite, paper grades, 267,000 tons; rayon grades, 122,000 tons; Unbleached Sulphite, 351,000 tons; Total Sulphate, 176,000 tons; Bleached Sulphate, 60,000 tons; Unbleached Sulphate, 116,000 tons; Soda, 17,000 tons; Total All Grades, 1,145,000 tons.

TACOMA

FULL BLEACHED KRAFT PULP

and UNBLEACHED
KRAFT PULP

Manufactured from
WESTERN HEMLOCK

**ST. REGIS
PAPER COMPANY**

Kraft Pulp Division

**TACOMA,
U. S. A.**

OUR AIM:

Maximum production consistent with maintenance of the enviable reputation that has been won by ST. REGIS "TACOMA" Bleached Kraft Pulp among the manufacturers of high quality papers and cellulose in the world markets.

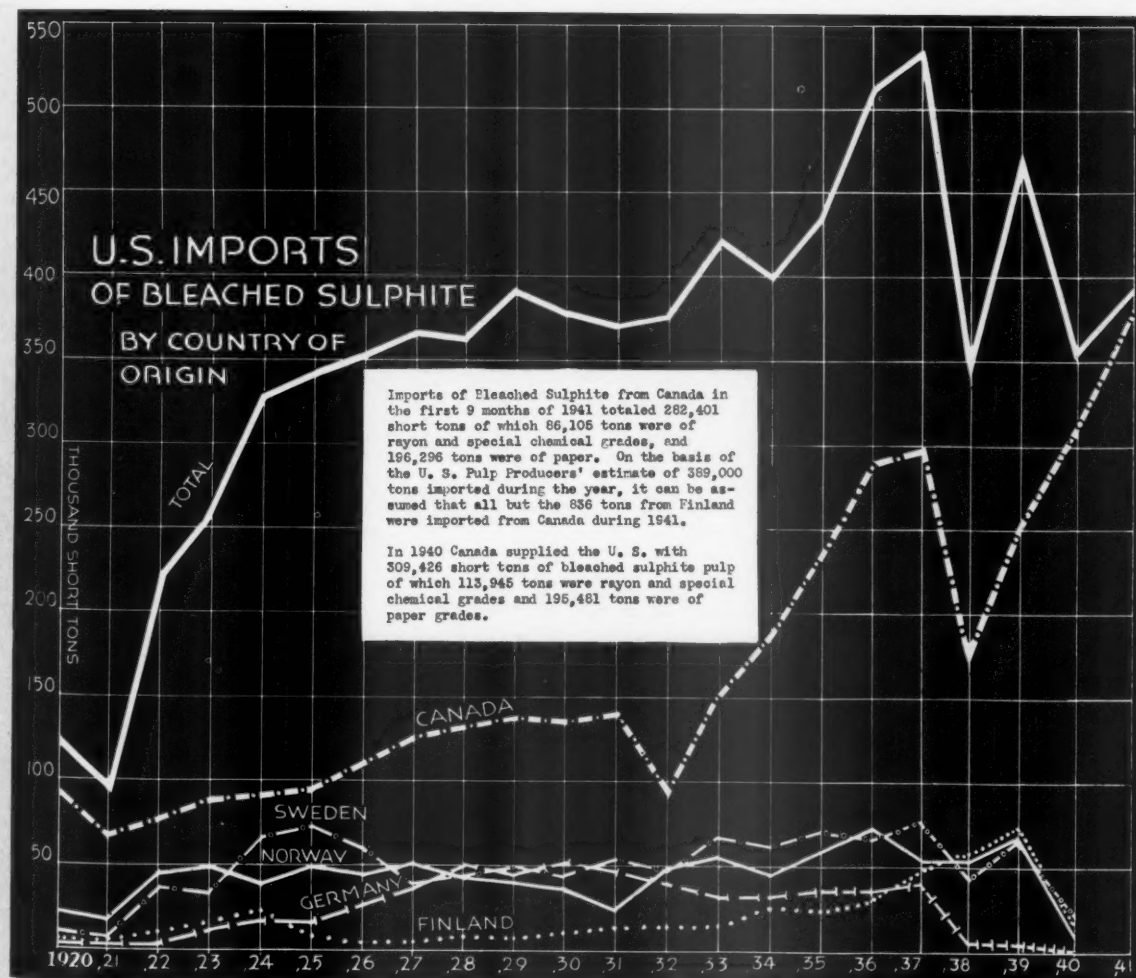
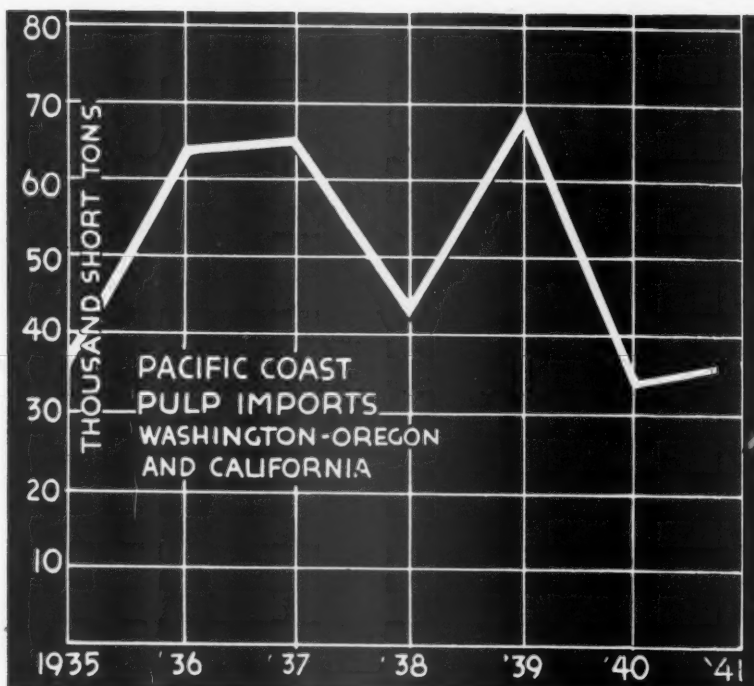
120,000 TONS ANNUAL CAPACITY

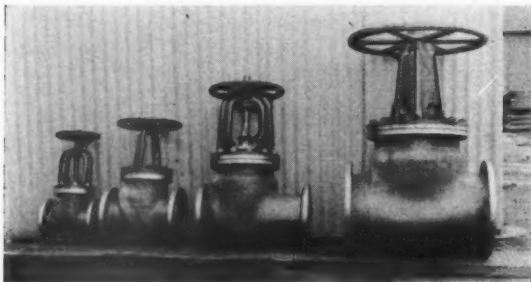


or 30 per cent were rayon grades. In 1940 the exports of bleached sulphite totaled 218,457 tons. The 1941 shipments were down 106,457 tons or 48.6 per cent. Paper grades in 1940 amounted to 103,253 tons. The 1941 exports were 25,253 tons or 24 per cent less. Rayon grades exported in 1941 were 81,204 tons less than the 115,204 tons exported in 1940 or down 70.4 per cent.

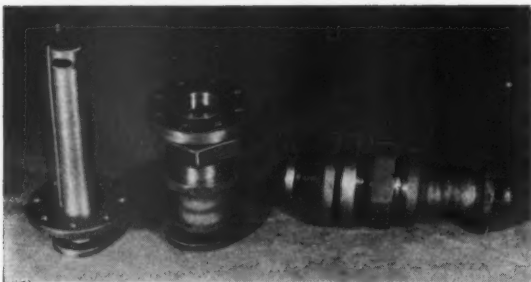
Unbleached sulphite pulp exports held fairly steady, the 1941 total of 68,000 tons being but 4,739 tons or 5.5 per cent below the 1940 exports of 72,739 tons. Exports of bleached sulphate pulp in 1941 were 10,377 tons or 7,828 tons, 40 per cent, below the 1940 exports of 18,205 tons.

Unbleached sulphate exports of 125,000 tons last year were 32,568 tons below 1940 exports of 157,568 tons or a decline of 20 per cent. Soda pulp exports last year amounted to 1,800 tons, a decline of 8,206 tons or 82 per cent below the 1940 exports of 10,006 tons.





ESCO STAINLESS STEEL SCREWDOWN SWING CHECK VALVES MANUFACTURED EXCLUSIVELY BY ESCO.

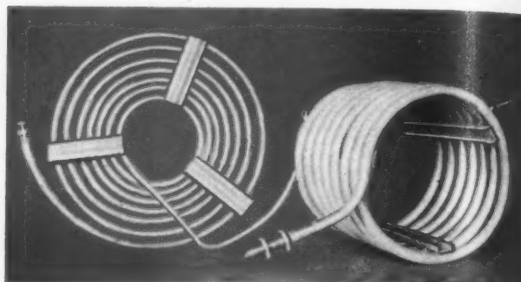


ESCO STAINLESS STEEL DIGESTER FITTINGS USED IN MANY OF THE SULPHITE DIGESTERS OF THE NORTHWEST.

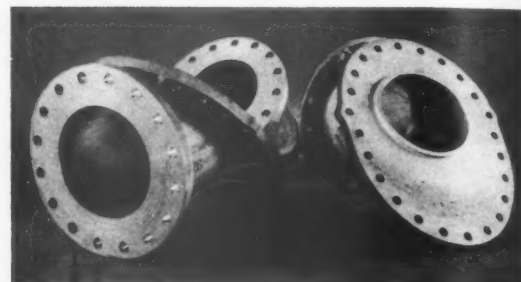


ESCO STAINLESS STEEL TOP RELIEF STRAINERS WHICH RENDER TROUBLE-FREE SERVICE IN SULPHITE DIGESTERS.

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UNITED STATES
Wood Pulp Imports by Grades and Countries of Origin—1940
(Short Tons)

Grade	Canada		Finland		Norway		Sweden		Others		Total	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Mechanical Wood Pulp												
Unbleached	161,757	\$ 4,527,565	1,226	\$ 27,341			8,530	\$ 164,666			171,513	\$ 4,719,572
Bleached												
Total	161,757	\$ 4,527,565	1,226	\$ 27,341			8,530	\$ 164,666			171,513	\$ 4,719,572
Sulphite												
Unbleached	219,016	\$10,556,172	33,184	\$ 1,389,876	1,646	\$ 61,867	122,243	\$4,584,509	4,824	\$ 163,065	*380,913	\$16,755,489
Bleached												
Rayon	113,945	8,939,199									113,945	8,939,199
Other	195,481	12,097,497	13,256	686,740	10,822	591,033	17,535	851,657	1,877	65,845	238,971	14,292,772
Total	528,442	31,592,868	46,440	\$ 2,076,616	12,468	\$ 652,900	139,778	\$ 5,436,166	6,701	\$ 228,910	733,829	\$39,387,460
Sulphate												
Unbleached	68,882	4,007,341	43,184	\$ 1,640,815	4,722	\$ 153,019	106,789	\$ 3,294,566			223,577	\$ 9,095,741
Bleached	58,462	4,373,760	2,500	152,284			23,925	1,265,325			84,887	5,791,369
Total	127,344	8,381,101	45,684	\$ 1,793,099	4,722	\$ 153,019	130,714	\$ 4,559,891			308,464	\$14,887,110
Soda	9,433	534,761					1,330	\$ 64,763			10,763	599,524
Other Grades							63	12,312			63	12,312
Total	826,976	\$45,036,295	93,350	\$ 3,897,056	17,190	\$ 805,919	280,415	\$10,237,798	6,701	\$ 228,910	1,224,632	\$60,205,978

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.
*Includes 5,913 tons of sulphite screenings valued at \$81,921.

U. S. WOOD PULP IMPORTS
Quantity and Value
1922-1941

	Total Bleached Sulphite		Bleached Sulphite Rayon and Special Chemical Grades*		Unbleached Sulphite		Unbleached Sulphate		Bleached Sulphate	
	Long Tons	Value	Long Tons	Value	Long Tons	Value	Long Tons	Value	Long Tons	Value
1941*	317,225	\$20,365,387	96,438	\$7,173,086	276,240	\$13,046,835	99,156	\$ 5,127,620	50,176	\$3,603,833
1940	314,150	23,231,971	102,412	8,939,199	340,155	16,755,489	199,654	9,095,741	75,795	5,791,369
1939	423,379	24,262,444	78,630	6,588,321	590,445	23,395,772	487,727	16,969,338	96,669	5,644,342
1937	465,372	29,443,254			835,929	34,663,053	565,718	22,269,976	101,682	7,014,450
1936	465,607	25,824,769			715,128	26,778,644	568,827	19,771,988	93,059	5,844,031
1935	383,475	21,934,054			618,872	24,026,340	470,329	15,893,593	75,600	5,193,789
1934	355,484	19,415,304			603,117	21,791,584	429,853	13,733,776	48,275	3,334,713
1933	400,633	19,138,468			643,003	19,946,124	461,890	12,568,367	36,622	2,361,882
1932	311,046	14,727,214			508,088	17,047,669	310,659	9,818,674	23,366	1,975,720
1931	319,518	18,887,719			540,478	23,033,069	344,612	12,035,030	29,683	2,267,090
1930	322,886	22,721,929			665,049	33,193,598	357,551	16,452,381	19,533	1,468,599
1929	334,235	25,338,603			701,456	35,328,982	384,005	20,518,676	15,364	1,139,820
1928	307,771	23,268,421			640,660	32,587,134	381,256	21,170,948	14,590	894,587
1927	311,130	24,224,626			613,856	32,262,845	341,162	20,684,298	10,789	708,712
1926	294,818	23,677,929			628,923	37,032,470	334,803	21,193,459	16,147	1,048,662
1925	286,976	22,527,879			579,284	31,542,079	306,073	18,257,446	17,419	989,933
1924	272,370	21,006,429			562,020	30,092,530	277,994	15,904,350	27,613	1,549,629
1923	250,580	22,245,868			461,853	26,548,431	233,696	15,228,747	15,422	1,080,961
1922	213,093	17,996,401			422,700	22,297,283	275,504	16,085,121	19,440	1,169,570
	Total, All Chemical Pulp		Mechanical Pulp		Total, All Grades Wood Pulp					
	Long Tons	Value	Long Tons	Value	Long Tons	Value	Long Tons	Value	Long Tons	Value
1941*	755,238	\$42,831,553	153,170	\$3,724,960	908,408	\$46,556,513				
1940	940,435	55,486,406	153,161	4,719,572	1,093,596	60,205,978				
1939	1,606,214	70,608,322	203,096	5,205,045	1,809,483	75,914,237				
1938	1,410,449	69,177,299	144,408	3,600,509	1,554,857	72,777,808				
1937	1,968,701	93,390,733	198,545	4,342,168	2,167,246	97,732,901				
1936	1,842,621	78,839,776	207,050	4,051,224	2,070,547	82,891,000				
1935	1,557,026	67,403,602	169,707	3,277,385	1,726,732	70,680,987				
1934	1,443,351	58,605,219	169,084	3,245,050	1,612,615	61,850,269				
1933	1,545,994	54,184,091	187,750	3,214,919	1,733,744	57,399,010				
1932	1,154,907	43,652,916	168,272	3,268,457	1,323,179	46,921,373				
1931	1,237,600	56,409,638	188,086	4,498,022	1,425,686	60,907,660				
1930	1,369,327	74,140,504	267,193	7,146,290	1,636,520	81,286,794				
1929	1,441,110	82,840,220	244,162	6,245,776	1,785,272	89,085,996				
1928	1,351,005	78,476,280	222,499	5,443,495	1,573,504	83,919,775				
1927	1,280,285	80,124,449	219,285	5,961,821	1,499,570	86,086,270				
1926	1,278,548	83,208,851	271,213	8,278,220	1,549,761	91,487,071				
1925	1,191,875	73,469,063	295,618	8,517,116	1,487,493	81,986,179				
1924	1,142,123	68,678,210	219,571	7,190,129	1,361,694	75,868,339				
1923	967,869	65,495,800	267,527	9,280,863	1,235,396	74,776,663				
1922	931,992	57,600,844	192,688	5,706,529	1,124,680	63,307,373				

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.
*Figures available for nine months of 1941 only.

UNITED STATES
Imports of Bleached Sulphite from 1920 to 1941
By Countries of Origin
(Long Tons of 2,240 Pounds)

Countries—	Canada	Sweden	Germany	Norway	Finland	All Others	Total
1920	86,055	6,788	200	13,435	5,329	2,663	114,470
1921	59,198	5,770	1,335	8,180	7,591	2,931	85,005
1922	122,347	39,340	3,152	39,153	5,393	3,708	213,093
1923	132,138	41,958	12,655	46,849	12,063	4,917	250,580
1924	135,943	64,221	17,054	35,279	6,960	12,912	272,369
1925	137,598	71,577	16,662	48,111	4,130	8,898	286,976
1926	152,764	58,623	25,944	45,416	2,739	9,332	294,818
1927	171,280	46,369	25,341	49,928	4,595	13,617	311,138
1928	176,807	36,237	39,592	40,212	1,500	13,578	307,926
1929	187,469	47,199	45,471	39,312	7,306	7,478	334,235
1930	181,195	43,916	46,101	36,758	7,335	7,358	322,693
1931	185,037	49,063	47,155	18,011	8,922	7,923	316,111
1932	150,589	46,735	38,185	46,971	11,708	24,340	318,528
1933	194,754	65,264	32,564	56,303	22,420	29,328	400,633
1934	179,320	59,253	34,661	46,878	20,054	15,318	355,484

1935-41 IMPORTS IN TONS OF 2,000 LBS.

1935	225,773	69,237	30,231	52,407	29,550	22,225	429,423
1936	281,062	67,309	34,792	70,950	31,131	26,924	512,168
1937	286,504	62,100	35,996	55,614	47,433	24,214	511,961
1938	167,024*	44,822	5,051	52,589	53,201	14,972	337,660
1939	252,414**	64,855	8,702	65,516	70,611	12,011	474,109
1940	309,426†	17,535	—	10,822	13,256	1,877	352,916
1941***	282,401††	—	—	—	836	—	283,237

Source—Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

*Includes 65,218 tons Rayon pulp.

**Includes 88,052 tons Rayon pulp.

†Includes 113,945 tons Rayon pulp.

††Includes 86,105 tons of Rayon pulp.

***Figures available for nine months of 1941 only.

UNITED STATES
Imports of Blached and Unbleached Sulphate—1920 to 1941
By Countries of Origin
(Long Tons of 2,240 Pounds)

Countries:	Sweden	Canada	Finland	Norway	All Others	Total
1920	25,012	114,175	7,762	3,363	1,236	178,548
1921	57,702	89,729	5,799	522	2,733	159,006
1922	122,545	137,307	23,631	8,850	2,611	294,944
1923	84,739	131,304	20,089	10,258	2,728	249,118
1924	144,148	125,256	17,749	13,080	5,474	305,707
1925	159,282	127,567	21,170	10,568	4,635	323,222
1926	169,810	140,625	25,006	11,798	3,711	350,950
1927	180,897	138,660	19,602	10,690	2,102	351,951
1928	201,757	141,779	32,139	15,761	4,410	395,846
1929	227,760	116,290	31,907	17,079	6,333	399,639
1930	247,361	76,334	35,427	13,072	3,677	338,714
1931	259,238	52,700	55,692	4,385	6,183	378,198
1932	227,226	37,283	45,278	13,285	1,798	324,870
1933	375,583	54,412	49,288	16,513	2,612	498,408
1934	332,019	77,017	52,367	14,263	2,462	478,128

1935-1941 IMPORTS IN TONS OF 2,000 LBS.

1935	429,916	94,748	66,286	17,356	3,036	611,342
1936	499,373	117,460	92,765	23,544	4,955	738,097
1937	501,499	114,053	97,927	17,798	2,938	734,215
1938	349,383	82,302	71,539	12,370	668	516,262
1939	389,187	104,255	130,015	15,825	15,137	654,419
1940	130,714	127,344	45,684	4,722	—	308,464
1941*	—	126,706	6,626	—	—	133,332

Source: Department of Commerce, Bureau of Foreign and Domestic Commerce.

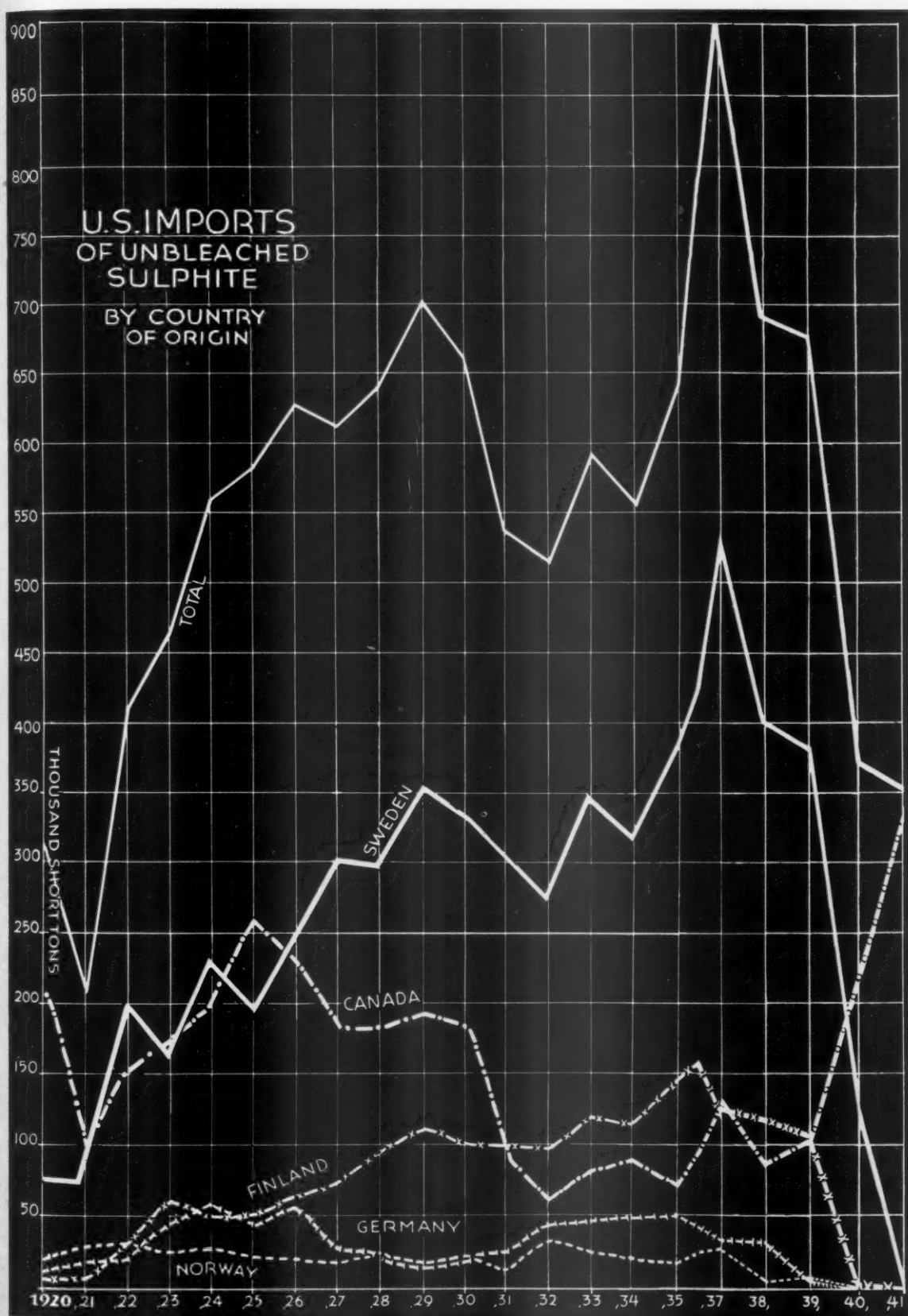
*Figures available for nine months of 1941 only.

PACIFIC COAST
Imports of Pulpwood
1941*

Customs District	Pulpwood—Rough				Pulpwood—Peeled				Pulpwood—Chipped	
	Spruce		Other		Spruce		Other		Cords	Value
Washington	54	\$239	—	—	164	\$807	8,507	\$38,190	25,926	\$14,672
Total: 34,651 cords, valued at \$53,908. All imported through the State of Washington Customs District.										

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

*Figures available for nine months of 1941 only.





THEY ARE SHEARING the sheep close to the skin nowadays. Rationing the wool for all non-essential purposes, too. Coats are shorter. No flaps to pockets. No cuffs to trousers. No pleats to skirts.

But there is no skimping of wool for Hamilton Felts. Priorities take care of that. Your paper machines must run overtime, over-speed and at top efficiency. They must be equipped with felts

of the best wools, to remove the most water and save steam at the driers.

Hamilton Felts do just that. We have the best of wools and the know-how to weave, full and finish them the best way for your particular type of paper machine and your special kinds of paper or board. Keep your presses properly adjusted—rolls free from crumbs. Hamilton Felts have the guts. Treat them right and they will last longer.

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UNITED STATES

Imports of Bleached Sulphate Pulp—By Countries or Origin—1930-1941
(Long Tons of 2,240 Lbs.)

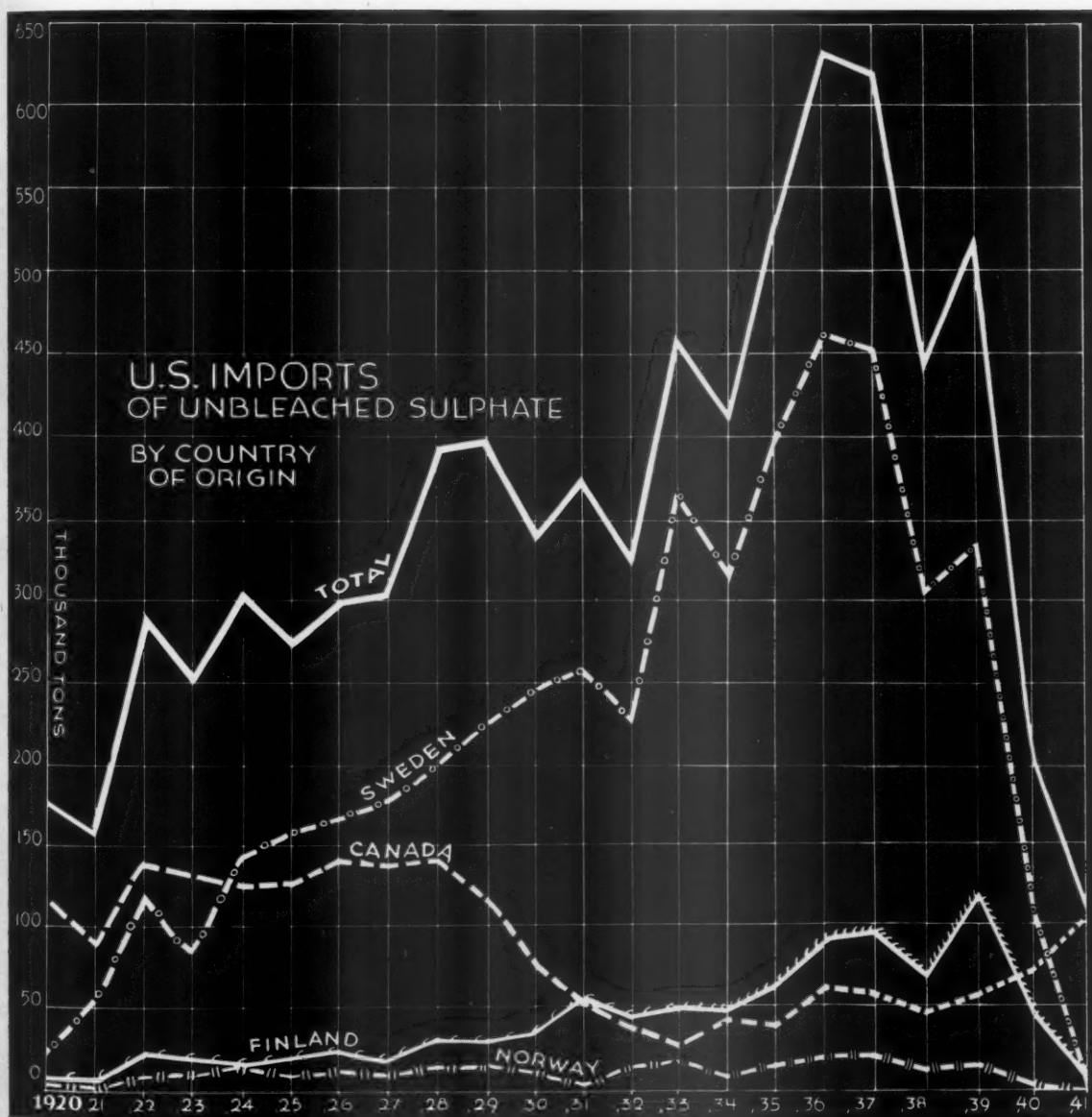
	Canada	Finland	Germany	Norway	Sweden	Others	Total
1930	12,505	2,445	256	—	—	387	22,108
1931	22,940	2,263	160	28	7,851	—	33,242
1932	19,872	1,522	—	324	1,648	—	23,366
1933	24,778	2,249	—	242	9,159	—	36,428
1934	30,804	2,740	—	452	14,279	—	48,275

1935-41 IMPORTS IN TONS OF 2,000 LBS.

1935	51,199	4,113	—	28	29,262	56	84,658
1936	53,244	5,440	—	230	41,461	—	102,375
1937	55,212	9,200	—	—	47,450	—	111,862
1938	33,992	2,617	—	310	53,254	—	90,173
1939	46,139	8,196	—	280	53,637	—	108,252
1940	58,462	2,500	—	—	23,925	—	84,887
1941*	44,139	661	—	—	—	—	44,800

Source—Department of Commerce, Bureau of Foreign and Domestic Commerce.

*Figures available for nine months of 1941 only.



IMPROVED SIZING

Manufacturers of hard-sized, kraft paper report:

1. Average pH without Sodium Aluminate 4.8 — average pH with Sodium Aluminate 5.5.
2. Average amount of Sodium Aluminate used 0.5%.
3. Average percent reduction in alum furnished 25.0%.
4. A definite increase in sizing due to ability to supply sufficient alumina and maintain optimum pH.
5. Reduction in degradation of fibres by raising pH.
6. A more efficient setting of color.

MORE PERMANENT PAPER

Manufacturers of high grade rag and sulfite papers—including bond, ledger and onion skin—report:

1. Average pH without Sodium Aluminate 4.5 — average pH with Sodium Aluminate 5.7.
2. Average amount of alum used 1.75%.
3. Average amount of Sodium Aluminate used 0.6%.
4. From no effect to marked improvement on sizing.
5. Reduction in sulfate content of the paper.
6. pH of the paper raised as high as 7, giving increased resistance to aging.

BETTER MACHINE CONDITIONS

Manufacturers of groundwood specialty papers report:

1. Average pH without Sodium Aluminate 4.3 — average pH with Sodium Aluminate 5.4.
2. Average amount of Sodium Aluminate used 0.3%.
3. Average percent reduction in alum 25.0%.
4. Elimination of sticking of wet web.
5. Better machine efficiency and improved sheet formation.

HELP! Prompt return of empty tank cars, carboys and returnable drums will help speed your next shipment of Monsanto chemicals... by helping to relieve critical shortages in shipping equipment.

LEADING PAPER MILLS REPORT

on Monsanto Sodium Aluminate for Sizing at controlled pHs

Many leading mills, manufacturing many different types of paper, have found that by using Monsanto Sodium Aluminate in conjunction with alum they are able to get satisfactory sizing at *any* desirable pH.

What this has meant in terms of better machine conditions, more efficient production and better paper is revealed in the summaries of their experience listed at the left.

★ ★ ★

THE EXPLANATION: Sodium Aluminate is an alkaline source of alumina as contrasted with alum, an acid source. By varying the proportion of sodium aluminate and alum used in the rosin sizing process it is possible to obtain any required amount of alumina at any desired pH. This permits greater flexibility in the sizing process and is a means of realizing the many benefits obtained by sizing paper at higher pHs.

★ ★ ★

SPECIFICATIONS: Monsanto Sodium Aluminate contains a minimum of 90% Sodium Aluminate, yet it remains *stable* in 6% water solutions for several weeks.

This exceptional stability keeps scale formation in dissolving tanks and pipe lines at a minimum.

Readily soluble in water, Monsanto Sodium Aluminate is low in insolubles and has the same iron content as iron-free alum on the alumina basis.

★ ★ ★

THE COST: Many cases are on record where the use of Monsanto Sodium Aluminate has resulted in a substantial net saving over the cost of the material. Compared with other alkalis sometimes used with alum for pH control, it is usually more economical in first cost and invariably its use results in greater benefits.

For full details and experienced technical service, inquire: MONSANTO CHEMICAL COMPANY, Merrimac Division, Everett Station, Boston, Massachusetts.



UNITED STATES
Imports of Unbleached Sulphite—1921 to 1941
(Long Tons—2,240 Pounds)

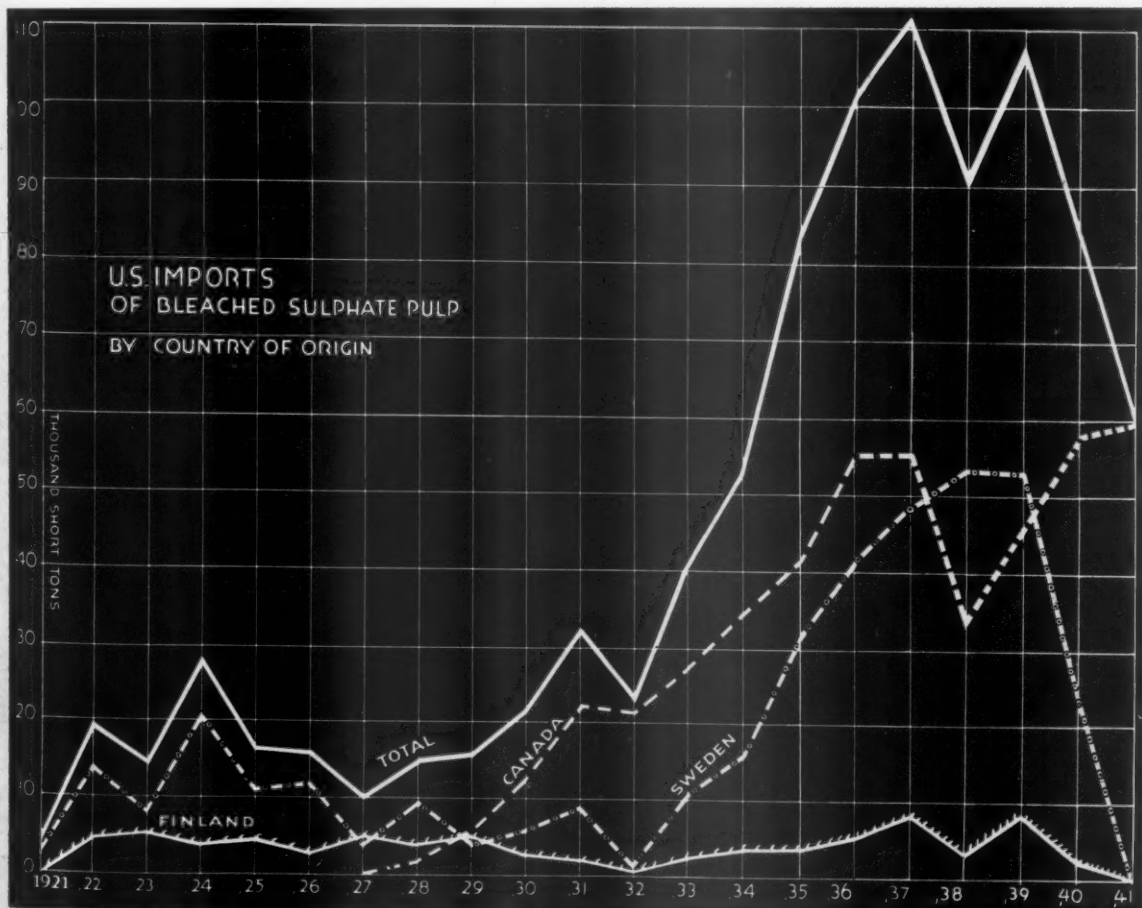
	Sweden	Canada	Finland	Germany	Norway	All Others	Total
1920	73,957	207,667	13,502	7,193	3,627	2,062	308,008
1921	73,070	88,112	24,696	14,308	3,137	4,770	208,093
1922	193,218	146,690	27,642	16,968	29,134	4,048	422,700
1923	159,065	167,725	58,602	42,851	21,222	12,388	461,853
1924	226,978	192,308	48,007	54,944	26,079	13,554	561,920
1925	193,034	253,670	48,996	42,362	20,639	20,083	579,284
1926	244,925	226,153	61,804	54,305	18,613	23,123	628,923
1927	299,875	179,630	70,106	25,487	17,747	21,011	613,856
1928	297,130	179,751	92,778	23,933	23,456	23,607	640,660
1929	350,152	190,565	109,121	16,822	18,325	16,471	701,456
1930	331,968	180,417	99,881	19,049	20,210	14,152	665,075
1931	300,682	88,604	97,467	22,212	10,195	16,850	536,010
1932	270,894	56,335	95,579	42,330	31,402	19,667	516,207
1933	346,684	76,537	116,019	43,895	26,597	33,271	643,003
1934	314,984	80,867	112,562	47,319	22,529	24,856	603,117

1935-1941 IMPORTS IN TONS OF 2,000 LBS.

	Sweden	Canada	Finland	Germany	Norway	All Others	Total
1935	377,320	67,404	146,166	50,024	16,539	35,573	693,026
1936	425,753	89,359	157,324	39,871	25,391	49,022	786,720
1937	539,488	128,469	123,112	32,740	28,479	67,326	919,614
1938	393,661	86,625	117,167	32,917	4,892	53,060	668,322
1939	374,003	110,144	115,844	12,440	14,145	34,617	661,193
1940	122,243	219,016	33,184	-----	1,646	4,824	380,914
1941*	-----	235,327	5,748	-----	-----	5,568	246,643

Source: Department of Commerce, Bureau of Foreign and Domestic Commerce.

*Figures available for nine months of 1941 only. All others includes imports from Newfoundland and New Brunswick.



• Another advertisement telling how different American industries are speeding up wartime production •



We've got to keep giving him 13 EXTRA to win the war

Taylor Instruments are helping America's planes fly farther faster...

► We'll win this war in the air. We'll win it because our planes are powered by the world's best gasoline.

Our planes use high-powered, 100-octane gasoline. Our enemies depend on gasoline which averages 87-octane. This 13-point lead gives an American pilot $\frac{1}{2}$ more power from his fuel than his opponent gets. Our boys can climb out of anti-aircraft fire 40% faster... fly higher than enemy planes of the same weight... get off the ground one-fifth faster. Our 100-octane gas reduces the fuel load so our bombers can carry 20% to 30% more bomb load, or fly farther with heavier armament.

We've got to "fill 'er up" for ourselves and our allies with three times as much 100-octane aviation gasoline as we're producing now—*increase production to 5 million gallons a day!* We can. We're going to. We're doing it. Taylor Instruments are helping the speed-up.

From pilot plants through commercial plants, Taylor Instruments and Taylor engineers have been a vital help in producing high-octane gasoline. Now every gasoline refiner considers instruments

essential. Taylor Instruments insure precision processing—automatically accurate and constant control of complicated chemical and physical reactions—complete, dependable uniformity—lower operating costs—more, *better* production.

With Taylor Instruments indicating, recording and controlling temperatures, pressures, liquid levels, rates of flow in all the perplexing, exacting refining operations, America's great oil industry is producing the high-grade gasoline and lubricating oil we need—and can produce more... *more... MORE!*

Uncle Sam and our allies are relying on Taylor Instruments to help produce:

100-OCTANE AVIATION GASOLINE

...in plants of the biggest producers of this type of fuel.

HIGH-GRADE LUBRICATING OIL

...in plants producing the quantities needed by tanks, cars, planes.

BETTER ASPHALT

...in plants furnishing this "quick take-off" surfacing for airfield runways and highways.

Without help from the oil industry, America couldn't win the war. Without the aid of automatic control instruments of the types made by Taylor, the oil industry couldn't hope to do its staggering job. Without Taylor Instruments, many another American industry could never have speeded up victory production. Are Taylor Instruments helping you do *your* war work? Are you really tuned up to turn it out? Taylor Instruments will help you *now*—America needs you *now*. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. Makers of the famous "Not 1 but 5" Fulscope Controllers. *Pacific Coast Sales Offices:* 145 Mission St., San Francisco, Calif.; Central Building, Los Angeles; Terminal Sales Bldg., Portland, Ore.

Taylor

Indicating / Recording / Controlling

**TEMPERATURE, PRESSURE, FLOW
and LEVEL INSTRUMENTS**

★ ★ ★ **HELP BEAT 'EM BY BUYING U. S. DEFENSE BONDS** ★ ★ ★

PACIFIC COAST PULP IMPORTS—1941*

(Short Tons)

Customs District	Unbleached Sulphite		Bleached Sulphite		Other		Unbleached Sulphate		Unbleached Groundwood		Bleached Groundwood		Totals	
	Tons	Value	Rayon & Chemical	Special Grades	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Washington	8,960	\$457,441	8,978	\$663,765	9,793	\$586,573	5,756	\$211,008	39	\$ 2,163	777	\$ 40,811	34,303	\$1,961,761
Los Angeles	1,154	67,345									87	5,136	1,241	72,481
San Francisco					26	1,780							26	1,780
Total	10,114	\$524,786	8,978	\$663,765	9,819	\$588,353	5,756	\$211,008	39	\$ 2,163	864	\$ 45,947	35,570	\$2,036,022

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

*Figures available for nine months of 1941 only.

PACIFIC COAST PAPER IMPORTS

1941*

(Short Tons—Value)

Customs District	Newsprint		Greaseproof & Waterproof		Kraft Wrapping		Other Wrapping		TOTAL	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Los Angeles	39,467	\$1,790,292							39,467	\$1,790,292
San Francisco	28,053	1,195,573							28,053	1,195,573
Washington	73,489	3,207,441			542	\$42,099			74,031	3,249,540
Alaska	25	1,134							25	1,134
Total	141,034	\$6,194,440			542	\$42,099			141,576	\$6,236,539

*Figures available for nine months of 1941 only.

No imports into Oregon or San Diego Customs Districts.

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

CANADA
Wood Pulp Exports

(Tons of 2,000 lbs.)

Year—	Chemical Pulp		Mechanical Pulp		Total, All Pulp	
	Tons	Value	Tons	Value	Net Tons	Value
1941	1,140,563	\$77,061,928	271,157	\$8,835,808	1,411,720	\$85,897,736
1940	864,406	54,665,080	204,084	6,265,069	1,068,490	60,930,149
1939	536,864	26,910,425	168,651	4,090,177	705,515	31,000,602
1938	429,832	24,816,491	124,202	2,914,247	554,034	27,730,738
1937	703,915	37,670,179	166,796	4,145,552	870,711	41,815,121
1936	620,977	28,405,644	133,512	2,841,051	754,489	31,246,695
1935	538,419	24,993,785	124,049	2,631,945	662,468	27,625,730
1934	486,990	22,716,942	118,645	2,727,902	605,635	25,444,844
1933	476,358	20,666,614	132,151	2,688,023	608,509	23,354,637
1932	336,063	16,367,976	116,229	2,562,080	452,292	18,930,065
1931	457,435	25,450,476	165,096	4,606,167	622,531	30,056,643
1930	551,413	33,092,807	208,759	5,967,172	760,172	39,059,979
1929	626,378	37,670,383	209,331	5,906,638	835,709	43,577,021
1928	660,136	40,068,703	203,670	5,546,120	863,806	45,614,323
1927	618,324	39,234,577	260,831	7,761,464	879,155	46,996,011
1926	621,004	40,571,304	382,077	11,505,818	1,003,081	52,077,122
1925	599,466	37,358,632	360,265	10,573,273	959,671	47,931,905
1924	528,279	32,326,943	253,699	7,916,029	781,978	40,242,972
1923					875,358	37,027,496
1922					818,246	41,037,849
1921					527,222	33,133,675
1920					819,985	76,563,978
1919					709,134	37,184,764
1918					583,911	33,359,927

Use of Wood Pulp for Rayon At New High in 1941

Wood pulp consumption up 20.4% over 1940—47.9% over 1939 . . . Rayon production and consumption continues to expand . . . Filament yarn production up 16% . . . Staple fiber jumps 50% . . . Rayon consumption rises 20%.

SINCE 1934 the use of wood pulp by the manufacturers of rayon yarn and staple fiber has increased yearly with the exception of 1938. From a consumption of 63,000 tons in 1934 the industry's requirements have grown to 214,500 tons in 1941. This was the first time that the rayon industry's use of wood pulp had passed the 200,000-ton mark.

Compared with the 1940 consumption of 178,000 tons the 1941 total was up 36,500 tons or 20.4 per cent. When compared with the 1939 consumption of 145,000 tons the volume employed last year in making rayon and staple fiber showed a large gain, 69,500 tons or 47.9 per cent.

Consumption of rayon grades of bleached sulphite pulp in 1941 was 302,767 tons, according to the United States Pulp Producers Association. This figure was obtained by adding the 1941 production of 214,767 tons to estimated imports (only

9 months reported) of 122,000 tons and subtracting exports of 34,000 tons (likewise estimated). The difference between the 302,767 tons and the Rayon Organon report as to consumption by the rayon industry of 214,500 tons or 88,267 is open to speculation. Part of it is in stocks. Part went into plastics, transparent cellulose sheeting, lacquers and possibly the nitrating or powder pulp is partially included in this difference.

Domestic sales of rayon grades of bleached sulphite pulps are reported by the United States Pulp Producers Association as totaling 196,564 tons in 1941.

The use of rayon and staple fiber has been given great impetus by the war. The elimination of silk, then Nylon and later the restrictions on the use of wool, have collectively added to the demand for rayon. Then, too, the Army has adopted rayon for a number of purposes in-

cluding tire fabric, parachutes and paratroop uniforms (half rayon and half cotton). The use of rayon by the armed forces will undoubtedly expand rapidly.

Continuous improvement in yarn qualities such as wet and dry strength and resistance to stretching had, before the war added its influence, already skyrocketed the demand for rayon. New uses were developing. Rayon carpet is one that promises a big new market. Lately the WPB authorized carpet mills to produce experimental carpets of part rayon nap with a part paper twine backing. It is reported that all rayon carpets were about ready for the market when we entered the war and that they stood up better than wool carpets.

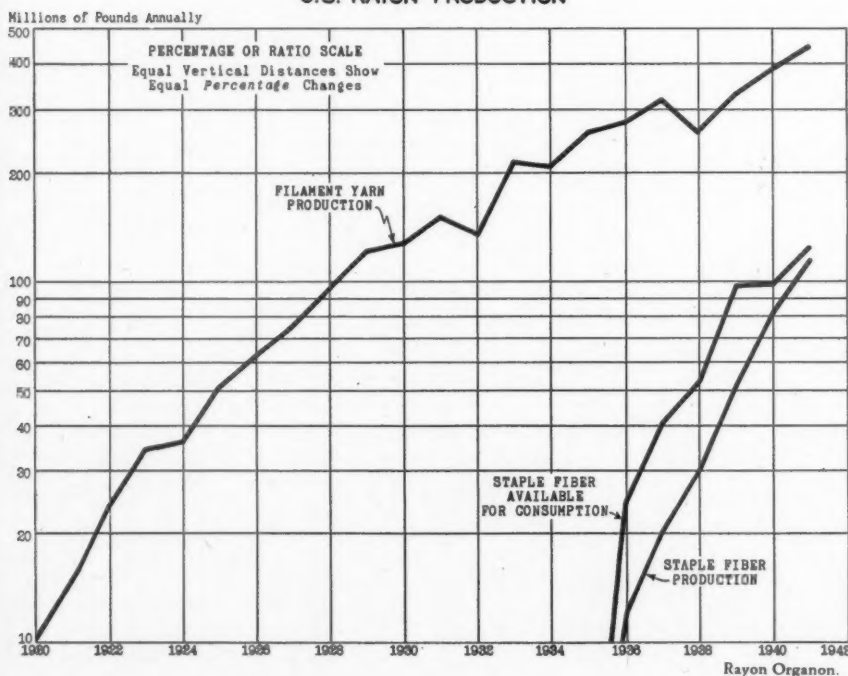
This Spring new rayon or part rayon products have appeared including rayon handkerchiefs (improved over those introduced last year). These are said to be 35 per cent more absorbent than linen though not as strong when wet. Bathmats, diapers, kitchen toweling, blankets, table linen and bed linen are relatively new fields being invaded by versatile rayon.

1941 Rayon Production and Consumption

● The Rayon Organon reports: "The 1941 annual production of rayon in the United States surpassed all previous records by a wide margin. Total domestic production of rayon (yarn plus staple fiber) in 1941 amounted to 573,230,000 pounds, an increase of 22 per cent over the previous record of 471,170,000 pounds in 1940.

"New all-time production highs were the 'order of the day' for all divisions of the rayon industry during 1941. Rayon filament yarn production at 451,204,000 pounds was 16 per cent greater than the 1940 output, the previous record year. Both the viscose-cuprammonium and the acetate branches of the yarn industry achieved new production records of 287,459,000 pounds and 163,745,000 pounds, respectively.

U.S. RAYON PRODUCTION



The 1941 domestic production of staple fiber at 122,026,000 pounds compared with an output of 81,098,000 pounds in 1940, an increase of 50 per cent; marked gains were made in the production of both viscose and acetate staple fiber here.

"The 1941 domestic consumption of rayon likewise was a new all-time high with a total of 586,016,000 pounds," states the Rayon Organon. "This was an increase of 20 per cent over the previous 1940 record. Of this 1941 consumption figure, 452,390,000 pounds were rayon filament yarn and 133,626,000 pounds represented rayon staple fiber available for consumption (domestic production plus imports).

"The 1941 consumption of rayon filament yarn at 452,390,000 pounds was 16 per cent above the previous record set a year ago. Both the viscose cuprammonium and acetate divisions reached new shipment levels.

"The consumption and production of rayon filament yarns was essentially equal in 1941, because the demand was limited entirely by what the industry could produce. The stocks of rayon yarn in the hands of rayon yarn producers both at the beginning and end of 1941 amounted to only a few days' supply.

"The imports of rayon staple fiber for consumption in 1941 were lower than in 1940, the figures being 11,600,000 pounds and 17,736,000 pounds respectively. Imports since the middle of 1941 have been negligible, and the outlook is for little or no imported staple. Thus, at least for the duration of the war, the domestic staple fiber industry faces alone the job of supplying this country's demand for rayon staple fiber."

United States Rayon Production in Millions of Pounds

	1941	1940	1939	1938	1937	1936	1930
Rayon Filament Yarn	451.2	390.1	328.6	257.6	321.7	277.6	127.3
Rayon Staple Fiber....	122.0	81.1	51.3	29.9	20.2	12.3	0.4
TOTALS.....	573.2	471.2	379.9	287.5	341.9	289.9	127.7

United States Rayon Consumption in Millions of Pounds

	1941	1940	1939	1938	1937	1936	1930
Rayon Filament Yarn	452.4	388.7	362	274	267	298	118
Rayon Staple Fiber....	133.6	99.1	96.5	53	41	25	1
TOTALS.....	586	487.8	458.5	327	308	323	119

World Rayon Production in Millions of Pounds

	1940	1939	1938	1937	1936	1935	1930
Rayon Filament Yarn	1,150	1,145	990	1,199	1,023	940	451
Rayon Staple Fiber....	1,350	1,082	958	619	299	140	6
TOTALS.....	2,500	2,227	1,948	1,818	1,322	1,080	457

Source: Rayon Organon, January, 1942.

Rayon Supply Very Tight

● "Rayon is in short supply," stated the Rayon Organon in January, 1942. Between the demand of regular rayon users and the demand of former silk users currently being supplied under the Silk Substitution Program, the rayon producing industry in 1941 was hard pressed to meet the situation. True, this was a civilian demand inasmuch as only a small part of the rayon yarn output in 1941 went directly into war products. But, 1942 will present a different picture. With the exhaustion of raw silk stocks and the growing importance of high-tenacity rayon yarns in war products, much

more of the rayon yarn output will be taken for direct military and naval uses. This outlook, moreover, does not include the rayon yarn to be exported to South and Central America under the Good Neighbor Policy.

"Rayon staple fiber in 1941 was strictly used in civilian goods. As yet there are no clear-cut developments indicating large war uses of this fiber in 1942. However, should a shortage of raw wool develop in this country because of successful Japanese operations in the Pacific, rayon staple fiber may provide the alternative fiber even for military clothing."

CELLULOSE CONSUMPTION BY THE U. S. RAYON INDUSTRY

Short Tons of Refined Cellulose

	TOTAL PULP		WOOD PULP*		LINTERS PULP*		RAW COTTON
	Tons	Per Cent	Tons	Per Cent	Tons	Per Cent	LINTERS† Bales
1930.....	72,000	100	45,000	62	27,000	38	115,000
1931.....	84,000	100	53,000	63	31,000	37	132,000
1932.....	74,000	100	43,000	58	31,000	42	132,000
1933.....	115,000	100	65,000	57	50,000	43	213,000
1934.....	112,000	100	63,000	56	49,000	44	209,000
1935.....	137,000	100	86,000	63	51,000	37	218,000
1936.....	151,000	100	104,000	69	47,000	31	201,000
1937.....	176,000	100	132,000	75	45,000	25	187,000
1938.....	147,500	100	110,000	75	40,000	25	160,000
1939.....	194,500	100	145,000	75	53,000	25	211,000
1940.....	238,000	100	178,000	75	60,000	25	256,000
1941.....	287,500	100	214,500	75	73,000	25	324,000

*Wood and linters in purified form as used by rayon producers.

†Bales of raw cotton linters figured on the basis of one-third overweight on refined linters pulp (due to refining losses) and converted to bales on the basis of 625 pounds net weight per bale.

Source: Rayon Organon, May, 1942.

Pacific Coast Payrolls Set New Records

THE high rate of operations during 1941 coupled with the highest hourly wage rate in the history of the industry resulted in payrolls of record size in Washington, Oregon and California.

Total wages paid by the industry in Washington, Oregon and California (the latter includes converting payrolls) amounted to \$33,753,707, an increase of \$5,377,320 or 18.9 per cent higher than the total

of \$28,376,387 paid in 1940. Washington and Oregon payrolls (manufacturing only, no converting) amounted to \$22,037,888 in 1941 as compared with \$18,428,053 in 1940. The gain was \$3,609,835 or 19.6 per cent.

Washington's pulp and paper mill payroll rose to a new high of \$17,236,948, an increase of 18.73 per cent or \$2,719,353 over the \$14,517,595 payroll of 1940. Previous

to 1940 the payroll of 1937 had held the record. The 1941 payroll was \$4,629,326 or 36.7 per cent higher than the 1937 payroll of \$12,607,622.

The hours worked by employees of Washington mills totaled 18,234,058, an increase of 7.86 per cent over the 16,905,387 hours worked in 1940. The 1941 hours were 1,928,125 hours or 11.8 per cent greater than the 16,305,933 hours worked in 1937.

STATE OF OREGON Payrolls and Employment 1927-1941*

PULP AND PAPER MANUFACTURING

Year	Payroll	Work Days	Approximate Number Employees
Fiscal Year 1927-1928	\$2,691,220.18	581,833	1,939
Fiscal Year 1928-1929	2,946,218.92	640,724	2,136
Six Mos. July to Dec., 1931, Inc.	1,017,435.13	235,114	1,566
Calendar Year 1932	1,896,692.09	504,311	1,681
Calendar Year 1933	1,819,904.95	535,789	1,786
Calendar Year 1934	2,577,436.84	700,842	2,336
Calendar Year 1935	2,984,889.22	778,547	2,837
Calendar Year 1936	3,578,624.01	839,063	2,697
Calendar Year 1937	4,298,917.22	857,696	2,861
Calendar Year 1938	3,207,313.93	596,405	2,052
Calendar Year 1939	3,089,061.69	580,161	2,044
Calendar Year 1940	3,910,458.40	674,075	2,338
Calendar Year 1941	4,800,939.96	742,011	2,577

*Statistics furnished by the Oregon State Industrial Accident Commission.

Data from July 1, 1929, to June 30, 1931, not available.

STATE OF CALIFORNIA Employment and Payroll Data in the Paper and Paper Products Manufacturing Industry 1941*

Based on All Contribution Reports Submitted to the Department Prior to February 25, 1942

Industry	Total wages paid	Wages subject to contributions	Number of establishments (a)	Number of Workers											
				Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Coated and Glazed Paper	750,377	676,573	9	312	325	313	337	339	367	435	450	469	435	414	440
Paper Envelopes	1,037,700	959,193	13	594	589	625	631	667	634	684	897	718	539	555	535
Paper Bags	496,939	468,214	6	432	401	414	478	495	412	221	201	228	131	204	292
Paper Board Containers and Boxes	7,471,421	7,045,861	55	3,739	3,786	3,919	4,156	4,288	4,442	4,450	4,522	4,504	4,533	4,481	4,299
Pulp Goods and Paper Products, not elsewhere classified	880,483	816,367	27	510	521	539	579	634	655	693	671	665	682	655	894
Unclassified (b)	1,078,899	979,415	11	462	490	494	487	503	567	570	602	559	575	583	567
Total	\$11,715,819	\$10,945,623	121	6,049	6,112	6,304	6,668	6,926	7,097	7,053	7,343	7,143	6,895	6,892	7,027

(a) Each branch of a multiple establishment-concern is counted as a separate establishment.

(b) Includes branches of such firms as pulp mills, paper mills, and paper board mills, consolidated to avoid divulging confidential information.

*California Department of Employment affiliated with Social Security Board. Report 127A No. 26. Research and Statistics April 2, 1942.

STATE OF WASHINGTON PAYROLLS AND HOURS WORKED 1927-1941

ALL HAZARDOUS INDUSTRY OF STATE				LUMBERING				PULP AND PAPER MANUFACTURING			
Year.	Payroll	Workmen Hours	Increase or Decrease Compared With Preceding Year	Payroll	Workmen Hours	Increase or Decrease Compared With Preceding Year	Payroll	Workmen Hours	Increase or Decrease Compared With Preceding Year		
			Work Hours			Work Hours			Work Hours		
1927	\$255,669,929	396,071,584	6.08%	\$83,446,482	130,841,328	.40%	\$4,855,526	7,710,848	14.78%		
1928	271,223,403	414,002,480	5.70%	83,782,300	127,973,488	-2.19%	5,573,223	8,507,600	10.33%		
1929	288,903,912	437,600,400	6.52%	86,986,842	131,720,152	3.82%	7,845,335	12,275,072	44.28%		
1930	260,002,808	397,369,096	-10.00%	63,093,612	98,102,528	-28.45%	9,110,285	13,874,832	16.12%		
1931	188,705,890	317,120,680	-27.42%	33,236,663	64,161,624	-47.32%	6,990,889	11,360,944	-23.26%		
1932	131,893,000	255,078,920	-30.11%	16,853,140	41,214,176	-49.29%	5,063,638	8,960,224	-27.57%		
1933	129,023,888	260,928,662	-2.18%	23,101,145	51,066,187	37.07%	5,166,375	9,693,579	2.03%		
1934	161,702,804	284,179,483	25.33%	29,693,289	51,106,876	28.54%	7,435,151	11,835,457	43.91%		
1935	187,578,233	312,935,429	16.00%	35,389,039	57,868,831	19.18%	8,131,888	12,560,285	9.37%		
1936	241,960,112	379,926,777	28.99%	51,799,595	77,214,714	46.32%	9,858,151	14,638,927	21.23%		
1937	286,480,085	412,743,811	18.40%	58,947,801	77,777,272	13.80%	12,607,622	16,305,933	27.89%		
1938	267,784,196	379,432,496	-6.53%	43,719,909	55,718,862	-25.93%	10,227,766	12,254,194	-18.88%		
1939	303,602,602	413,236,113	+13.38%	50,275,519	63,648,087	+14.99%	11,919,822	14,197,262	+16.54%		
1940	345,887,756	458,512,732	+13.93%	56,867,830	70,377,299	+13.11%	14,517,595	16,905,387	+21.79%		
1941	475,291,383	561,751,286	+37.41%	69,603,895	76,588,933	+22.40%	17,236,948	18,234,058	+18.73%		

Industry as a whole: Payroll in 1941 was 85.90% more than in 1927 while hours worked show an increase of 41.83% and payrolls in 1941 showed an increase of 64.52% while hours worked showed an increase of 28.37% in comparison with 1929, the peak year other than 1940.

Lumbering Industry: Payroll and hours worked respectively in 1941 were 16.59% and 41.46% less than in 1927, and 19.98% and 41.85% less than in 1929, the peak year.

Pulp and Paper Mfg.: Payroll and hours worked respectively in 1941 were 255.00% and 136.47% greater than in 1927. The payroll in 1941 was 119.71% more and the hours worked were 48.55% more than in 1929; payroll and hours worked respectively were 36.72% and 11.82% more than in 1937, the previous peak year to the year 1940 in this industry.

Source: Department of Labor and Industries, State of Washington.

Oregon's Payroll

● Oregon's pulp and paper mill payroll for 1941 totaled \$4,800,940, a gain over the previous year's payroll which amounted to \$3,910,458 of \$890,482 or 22.8 per cent. The 1941 payroll was \$502,023 more than the previous record of \$4,298,917 paid in 1937. The gain in percentage was 11.7 per cent.

Work days by employees of Oregon mills in 1941 totaled 742,011 as compared with 674,075 in 1940, an increase of 67,936 work days or 10 per cent. The work days in 1941 were below three previous years, 1935, 1936 and 1937. In the latter year 857,696 work days were recorded. The work days in 1941 were 115,685 days less or 13.4 per cent below those of 1937. The 1941 payroll was \$502,023 or 11.7 per cent more than in 1937. It will be noted from the table that fewer employees worked in the Oregon mills in 1941 than in three previous years, 1935, 1936 and 1937.

California's Payroll

● The payroll of the industry in California appears for the second year. Last year the industry paid out total wages of \$11,715,819 as compared with \$9,948,334 in 1940. The increase was \$1,767,485 or 17.7 per cent. The number of employees in 1941 ranged from a low of 6,049 in January to a high of 7,343 in August. In 1940 the range was from 5,935 in April of that year to a high of 6,429 in November.

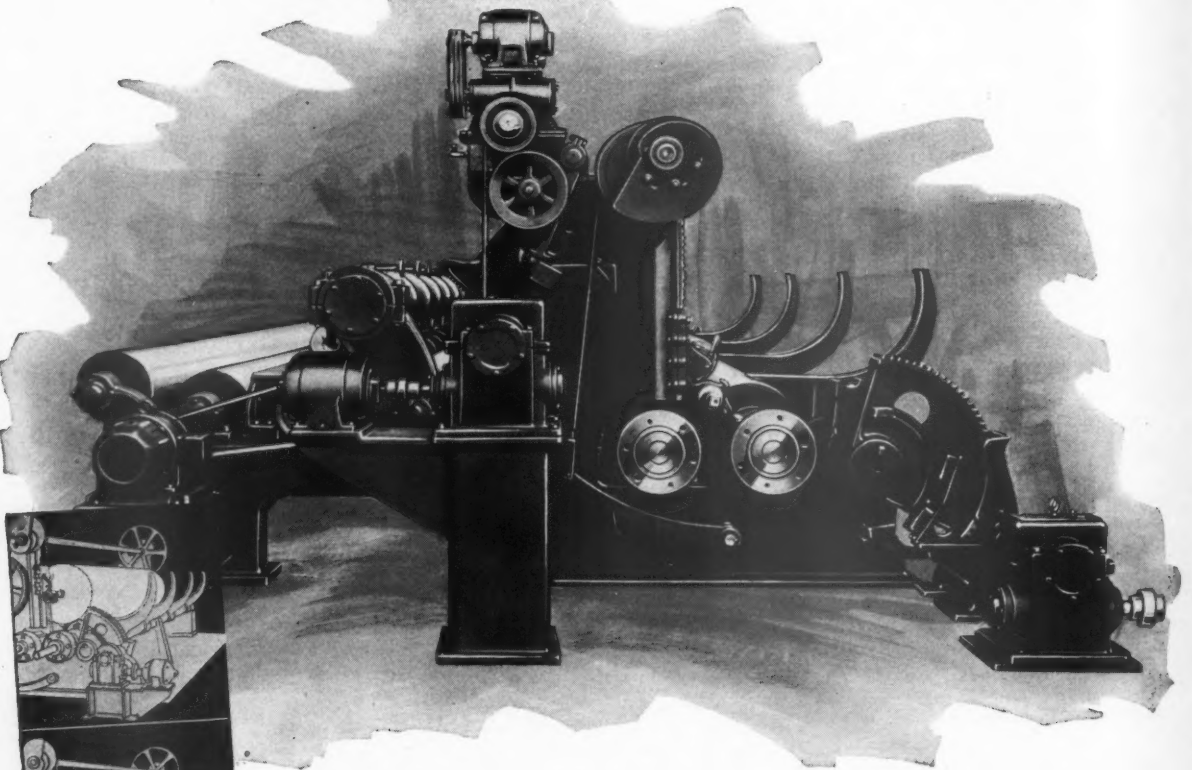
Offsetting Decline in Lumbering

● In Washington the growth of the pulp and paper payrolls has largely offset the decline in the lumbering industry. The latter industry's payrolls declined from \$83,446,482 in 1927 to \$69,603,895 in 1941, a drop of \$13,842,587. On the other hand the pulp and paper industry payrolls have grown from \$4,855,526 in 1927 to \$17,236,948 in 1941, an increase of \$12,381,422. The pulp and paper mills were within \$1,461,165 of equaling the decline in lumbering.

The value of the developing pulp and paper industry to the state is far greater than is shown by these figures. It has provided a market for hemlock, a previously unwanted wood. Its purchases of supplies and equipment are far higher per workman than the lumbering industry. Then, too, it is more stable in its operations. Even in the depression years the pulp and paper industry remained relatively stable when compared with the lumbering industry.

12 Seconds

FROM WINDER TO FLOOR



THE BAGLEY & SEWALL WINDER

"A Masterful Accomplishment"

THIS winder is constructed to meet the most advanced developments of papermaking requirements. It is designed to be a real adjunct to the finest paper machines built--and--its actions speak louder than words. A skillful application of all known principles and requirements of correct paper winding is demonstrated by its performance.

The factor of speed has no bearing on the uniform high quality of production. Regardless of speed this winder will produce the finest rolls without rejections and eliminate one traditional source of trouble in the mill.

A bulletin fully describing the many features of the winder will be gladly sent upon request.

On completion of winding, roll is moved from over drums to cradle. It is then lowered to truck or floor. All of these operations are fully automatic.

THE BAGLEY AND SEWALL COMPANY - - WATERTOWN, NEW YORK

THE accompanying tables show the latest figures on the volume of pulpwoods, other than Douglas fir, available for cutting in western Washington and western Oregon.

They do not include timber on municipal watersheds, state and national forests, national parks, etc., which, because of laws or declared public policy, is not available for commercial use.

In this region there is nearly eighty billion cubic feet of Douglas fir, about twice the volume of the true pulping species. This species is not included, but in view of recent progress in the pulping of this wood experimentally, it should be considered when analyzing the timber available for future use.

These figures are from data prepared by the Pacific Northwest Forest and Range Experiment Station, Portland, based on forest surveys started in 1930, and completed in 1933 and 1934. The results were first published in the Review Number of this journal in 1937, and revised in the 1938, 1939, 1940 and 1941 Review Numbers. References may be made to the 1938 issue for greater detail as to the forest study.

● Since completing the survey the Experimental Station staff has started the work of reinventorying each county through field examination. To date the recheck has been completed for 19 counties where the heaviest cutting has occurred: Grays Harbor, Pacific, Pierce, Snohomish, Thurston, Cowlitz, Clallam, Wahkiakum, Lewis, Kitsap, Jefferson, Mason and King Counties in Washington; Clatsop, Columbia, Coos, Washington, Benton and Polk Counties in Oregon. The revision in four other counties, Skagit, Whatcom, Island and San Juan, in Washington will be completed later this year, and work is being continued in other

Pulpwood Resources Of the Pacific Northwest

Data on available pulpwood in Western Washington and Western Oregon revised in 1941 by the Pacific Northwest Forest & Range Experiment Station — Data for Inland Empire revised in 1940 by the Northern Rocky Mountain Forest & Range Experiment Station.

counties. It is expected that the re-inventories will be completed at the rate of five or more counties per year.

● Figures on the counties named are based on the re-inventory. The other counties have been brought up to date by adjusting for estimated depletion since the original survey, the depletion being determined from the timber cut figures.

Although the data are partially based on estimates of depletion, the figures have been rounded to thousands of cubic feet, and because of the large volume, the percentage of error can be considered relatively small. The tables are sufficiently accurate for all practical purposes.

The cubic foot volume estimates give the total sound wood content of the stem of the tree, exclusive of bark and limb wood. Decayed material is omitted, as well as the entire volume of all cull logs having more than two-thirds of the board-foot content defective. No deduction is made, however, for breakage in logging.

The tables do not take into consideration the economic availability of the pulp species, that is, whether or not the timber could be profitably logged at this time. Table III, page 111 of the 1938 Review Number, gives this information. Changes through depletion make revision of this particular table impractical, but

if desired, the reader may refer to the 1938 figures, since the percentages in each class of economic availability remain approximately the same at this time.

The ratio of timber in the various ownership classes also remains about the same. Approximately 45 per cent is privately owned, 43 per cent on national forest lands and 12 per cent on other public lands such as county, state, Indian reservations, etc.

Geographical distribution of pulpwood volume is shown by counties in Table II.

● In the Inland Empire Area the data on pulpwood species in Northern Idaho, including Engelmann spruce, Western and mountain hemlock, grand fir and black cottonwood, have been revised by the Northern Rocky Mountain Forest and Range Experiment Station at Missoula, Montana. In revising the accompanying table, M. Bradner, director of the station, stated:

"Estimates for Northeastern Washington and Northern Idaho are based on a revision of 1932-1935 forest survey data. The use of different board foot-cubic foot conversion factors account for the change in the estimates for Western Montana.

"Heretofore the Montana data included only the sawlog portion of the trees, with a minimum top

Table I

Volume in thousand cubic feet¹ of pulp wood other than Douglas fir, in Western Washington and Western Oregon, available for cutting,² by species and group³

Species.	Western Oregon	Western Washington	Total
Western hemlock	5,796,000	15,680,000	21,476,000
Sitka spruce	998,000	1,228,000	2,226,000
Balsam firs ⁴	3,464,000	5,972,000	9,436,000
Mountain hemlock and Engelmann spruce	943,000	309,000	1,252,000
Black cottonwood	64,000	124,000	188,000
Total	11,265,000	23,313,00	34,578,000

¹ Includes all trees 4 inches and more diameter breast height.

² Excludes timber reserved for cutting in municipal, State, and Federal ownership.

³ Data from Pacific Northwest Forest and Range Experiment Station. Based on Forest Survey inventory of 1933 adjusted for estimated cutting depletion 1934-1940, inclusive.

⁴ Includes Pacific silver fir, Grand fir, noble fir, Shasta red fir, white fir, and alpine fir.

diameter ranging from 8 to 16 inches; no cottonwood limbwood was included. Except for the fact that in Western Montana no estimates are available for cordwood trees, the data for the three subregions are now on a comparable basis."

These revisions brought the Englemann spruce totals for Northeastern Washington from 16,368,000 cubic feet to 29,900,000 cubic feet; for Northern Idaho from 584,200,000 cubic feet to 595,100,000 cubic feet, and for Western Montana from 946,000,000 cubic feet to 1,018,200,000 cubic feet.

The new table shows for hemlock an increase for Northeastern Washington to 45,300,000 cubic feet from 18,799,000 cubic feet in the previous table; for Northern Idaho to 374,600,000 cubic feet from 366,300,000

cubic feet; and for Western Montana to 36,000,000 cubic feet from 30,008,000 cubic feet.

In the revised table grand fir shows an increase for Northeastern Washington from 26,015,000 cubic feet to 70,000,000 cubic feet; for Northern Idaho from 1,655,000,000 cubic feet to 1,692,000,000 cubic feet; and for Western Montana from 102,322,000 cubic feet to 122,800,000 cubic feet.

The revisions reduce the black cottonwood figures for Northeastern Washington from 37,000,000 cubic feet reported a year ago to 36,000,000 cubic feet; but increase the total for Northern Idaho from 11,361,000 cubic feet to 12,100,000 cubic feet; and for Western Montana from 24,838,000 cubic feet to 42,900,000 cubic feet.

Totals for all species were revised upward in the new table accom-

panying this article. The total for Northeastern Washington was increased from 61,219,000 cubic feet to 145,236,000 cubic feet; for Northern Idaho from 2,616,861,000 cubic feet to 2,674,700,000 cubic feet; and for Western Montana from 1,103,168,000 cubic feet to 1,203,900,000 cubic feet. It will be noted from the footnote to the table that no estimates are as yet available for cordwood trees in Western Montana.

● On March 26, 1942, Mr. Bradner wrote: "No revision of pulpwood volumes has been made within the past year. Such changes as may have occurred in the meantime are believed to have been too slight to warrant adjustments.

"The extensive estimates for Western Montana are still the best information available, but we will have complete Forest Survey estimates for this subregion some time in July."

Table II

Volume of pulp woods, other than Douglas fir, in Western Washington and Western Oregon available for cutting, by county.¹

Washington			Oregon		
County	In thousands of cubic feet		County		
Clallam	2,784,000		Benton	37,000	
Clark	34,000		Clackamas	1,113,000	
Cowlitz	895,000		Clatsop	1,188,000	
Grays Harbor	2,608,000		Columbia	41,000	
Island	9,000		Coos	375,000	
Jefferson	2,242,000		Curry	185,000	
King	1,956,000		Douglas	1,631,000	
Kitsap	19,000		Hood River	289,000	
Lewis	2,088,000		Jackson	959,000	
Mason	340,000		Josephine	110,000	
Pacific	1,809,000		Lane	1,557,000	
Pierce	1,253,000		Lincoln	616,000	
San Juan	11,000		Linn	1,453,000	
Skagit	1,767,000		Marion	511,000	
Skamania	1,824,000		Multnomah	32,000	
Snohomish	2,185,000		Polk	175,000	
Thurston	32,000		Tillamook	923,000	
Wahkiakum	471,000		Washington	50,000	
Whatcom	986,000		Yamhill	20,000	
Total	23,313,000		Total	11,265,000	

¹Includes all trees 4 inches and more diameter breast height.

²Compiled by Pacific Northwest Forest and Range Experiment Station from forest-survey data adjusted for estimated depletion by cutting to 1941.

INLAND EMPIRE PULPWOOD

Amount of Pulpwood in the Inland Empire by Species and Locality in Thousands of Cubic Feet

Subregion ¹	Thousands of Cubic Feet								
	Engelmann Spruce			Hemlock			Grand Fir ²		
	Saw timber trees	Cordwood trees	Total	Saw timber trees	Cordwood trees	Total	Saw timber trees	Cordwood trees	Total
Northeastern Washington ³	16,100	13,800	29,900	23,500	21,800	45,300	28,600	41,400	70,000
Northern Idaho ⁴	464,500	130,600	595,100	189,400	185,200	374,600	1,211,300	481,600	1,692,900
Western Montana ⁵	1,018,200	1,018,200	36,000	36,000	122,800	122,800
Total for Inland Empire	1,498,800	144,400	1,643,200	248,900	207,000	455,900	1,362,700	523,000	1,885,700
							53,328	1,708	55,036
							3,163,728	876,108	4,039,836

¹Northeastern Washington consists of Spokane, Stevens and Pend Oreille counties. Northern Idaho is the portion of that State north of the Selkirk River. Western Montana is the portion west of the Continental Divide.

²Included with hemlock and grand fir are small quantities of mountain hemlock and alpine fir respectively.

³Volumes indicated are for all unreserved commercial forests, i.e., economically available for cutting, either now or prospectively, and are based on 1932-35 forest survey data adjusted for growth and drain to January 1, 1941. Under saw timber is included the volume of coniferous trees larger than 13 inches d.b.h. and the volume of cottonwood trees larger than 11 inches d.b.h.; under cordwood is included the volume of trees from 5 inches d.b.h. to saw-timber size. All volume estimates are for the sound wood volume exclusive of bark to a 4-in-6 inch top diameter. The cottonwood estimate includes the volume of peeled limbs 4 inches and larger in diameter.

⁴Volumes are for saw timber trees only and are based on extensive estimates.

⁵To convert the cubic-foot volumes of saw timber trees to Scribner log scale, multiply by the following factors: Engelmann spruce—5.7;

hemlock and grand fir—5.1; cottonwood—3.8.

Source: Northern Rocky Mountain Forest & Range Experiment Station, Missoula, Montana. M. Bradner, Director, states that the use of different board-foot-cubic foot conversion factors account for the change in the estimates for Western Montana over previous tables. Heretofore the Montana data included only the sawing portion of the trees with a minimum top diameter ranging from 8 to 16 inches; no cottonwood limbwood was included. Except for the fact that in Western Montana no estimates are available for cordwood trees, the data for the three subregions are now on a comparable basis.

The Pacific Coast Industry Offers a Large Variety of Products

As the market grows the variety of pulps, papers, paperboards and converted products manufactured in the region continue to expand—This list is presented as a service to the industry and to its customers.

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THE ADHESIVE PRODUCTS INC. San Francisco Products

Gum Sealing Tape
Bookbinders' Gummed Hollands
Stay Tape
Veneer Tapes
Corrugated Box Tapes
Industrial Adhesives

ANACORTES PULP COMPANY Anacortes, Wash. (Wholly owned subsidiary of the Scott Paper Co., Chester, Pa.) Products

Unbleached Sulphite Pulp

ANGELUS PAPER BOX CO. Los Angeles Products

Corrugated Paper Boxes
Folding and Set-Up Boxes

ANGELUS PAPER EXCELSIOR PRODUCTS CO. Los Angeles Products

Adding Machine Paper
Cash Register Paper
Tabulator and Teletype Paper
Addressing and Listing Papers
Embossed Packing
Serpentine
Other Roll Paper Specialties
Paper and Wood Excelsior
Paper and Wood Furniture Pads
Embossed Chip Board
Pipe and Tire Wraps

B

BARTRAM PAPER PRODUCTS CO., LTD. Vancouver, B. C. Products

Bag Specialties
Candy Bags
Cellophane Bags
Coffee Bags
Garment Containers
Glassine Bags
Greaseproof Specialties
Grocery Bags
Laundry Bags
Millinery Bags
Shopping Bags
Notion Bags

J. E. BERKHEIMER MFG. CO. Tacoma, Wash. Products

Saturating Felt
Building Paper

Deadening Felt
Roof Coatings
Composition shingles
Asphalt
Brick Siding

BRITISH COLUMBIA PULP & PAPER CO., LTD.

Office, Vancouver, B. C.
Mills, Port Alice and Woodfibre, B. C.
Products
Bleached Sulphite Pulps for Rayon and
High Grades Papers

BROWN PAPER GOODS CO. OF CALIFORNIA Los Angeles, San Francisco and Seattle Products

Glassine and Allied Bags
Lo Fold Napkins
Cocktail Napkins
Retail Pkgs. Sandwich Bags

C

CALIFORNIA CONTAINER CORP. Emeryville, Calif. Los Angeles, Calif. (Western Container Company) Seattle, Wash. Portland, Oregon Products

Corrugated Fibre Containers for All
Commodities—
Fruit and Vegetable Canners Cases
Frozen Food Shipping Cases
Egg Cases
Dried Fruit Cases
Baby Chick Boxes
Corrugated Fruit Packing Supplies
Apple Boxes
"Fruit Cradles," "Wrapaks"

CALIFORNIA ENVELOPE CO. San Francisco Products Commercial Envelopes Lithographed and Printed

CALIFORNIA-OREGON PAPER MILLS Division of Columbia River Paper Mills Los Angeles, Calif. Products

Wrappings—
Tissues—
Sulphite
Fruit Wraps—
Oiled, plain and printed
Waxing Papers—
Plain and printed
Vegetable Parchment
Plain and printed
Specialties

CAPITAL ENVELOPE CO., LTD. Los Angeles Products Envelopes, commercial and special Glassine Bags, plain and printed

CARPENTER ENVELOPE COMPANY Division of Carpenter Paper Co. Los Angeles Manufacturers Products Complete line of Envelopes

CENTRAL FIBRE PRODUCTS CO. (Formerly Colorado Paper Products Co.) Denver, Colo. Products

Manila Vat-lined Box Boards
Book Vat-lined
News Vat-lined
Test Liner
Test Chip
Pasted Chip
Pulp Wall Boards
Container Stocks
Sheathing
White Blanks
Colored Folding Box Boards
Set Up Box Boards
Plain Chip, Rolls and Sheets

CERTAIN-TEED PRODUCTS CORP. Richmond, Calif. Products

Roofings—
Mineral Surfaced Shingles
Mineral Surfaced Roll Roofings
Smooth Surfaced Roll Roofings
Felts and Building Papers—
Asphalt felt, 15, 20 and 30 lb.
Asphalt sheathing
Tufite Kraft Sheathing
Blue pasterboard, 30 and 60 lb.
Deadening felt, ¾, 1 and 1½ lb.
Sheathing paper, 20 and 30 lb.
Asbestos—cement siding
Unsaturated felt and building pa-
pers
Lining Felt—
Brands
Shingles—
15" Thick Butt
12" Thick Butt
Cut-Out
Waverly
Hexagonal
Universal
Mul-T-Form
Individuals
Dutch Lap
Saf-T-Lok, French Lock
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 White and Colored Napkin Tissue
 Bleached Specialties
 Sulphite Bonds
 Envelope
 Writings

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 Los Angeles
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 Satchel Bottom (FUL-LOK)
 Cellophane Envelopes—
 Coffee Bags, Flavo Fresh
 Glassine Bags—
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 Square
 Glassine Envelopes, Open End
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 Self-Opening with full-length (strip) window
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 One Side
 Two Sides
 Pre-printed
 Catalog Envelopes, Open End
 Kraft Bags, Miscellaneous except Grocery
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 Square
 Flavo-Fresh Sandwich Bags
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 Kleenway All-Purpose Bags
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 Crown Envelope Manila
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 Crown Alfibre Fruit Wrap
 Crownail Fruit Wrap
 Crown Copperized Alfibre Fruit Wrap
 Crown Tomato Wraps—M. F.—White
 Crown Cantaloupe Wrap—Treated Manila
 Grocery Bags—
 Crown Kraft—S. O.
 Otter—S. O.
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 Crown Flash Tite Sealing Tape
 Kraft Wrapping—
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Crown Manila
Crown Grocerwrap

Tire Wraps—

Crown Tire Wraps

Waxing Sulphite

Crown Opaque Bread Wrap
Crown Bleached Waxing Sulphite

Waxing Tissue—

Crown Snowtex Waxing Tissue
Crestex Waxing Tissue

Waxed Papers—

Crown Waxfibre
Alpine Waxfold
Crest Waxfibre
Florist Tissue

Waterproof Paper (Laminated)—
Crown Laminated Kraft

CROWN WILLAMETTE PAPER CO.

Division Crown Zellerbach Corporation

Los Angeles

Products

Self-opening Grocery Bags (Otter Kraft)

Fruit Wraps, plain and printed
Napkins

Embossed Semi-crepe Napkins
Fixture and Special-fold Napkins
Package Napkins—

CROWN ZELLERBACH CORP.
NATIONAL PAPER PRODUCTS
CO. DIVISION

Port Townsend, Wash.

Products

.016 Kraft Liner Board
.030 Kraft Liner Board
.016 to .038 Suit Box Board
Cement Bag Paper
Grocery Bag Paper
Sack Paper
Kraft Wrapping Paper

D

DIXIE-VORTEX CO.

Los Angeles, Calif.

Products

Paper Water Cups
Paper Soda Cups
Paper Ice Cream and Food Containers
Cellophane-Wrapped Packaged Paper
Cups

E

EL REY PRODUCTS CO.

Los Angeles

Products

Asphalt Roofing
Asphalt Slate Surfaced Shingles
Composition Shingles
Saturated Lining Felt
Saturating Felt
Deadening Felt
Red and Gray Duplex Sheathing
Car Linings
Industrial Floorings
Dry Felts
"Metallic" Surfaced Roofing

THE ENVELOPE CORPORATION

San Francisco

Products

Envelopes of every description—Printed and Plain

ENVELOPE MANUFACTURING CO.

Los Angeles

Products

All types of Envelopes

EVERETT PULP & PAPER CO.

Everett and West Tacoma, Wash.

Products

Book Papers—

Nautilus E. F. Book, White, India, Yellow, Blue, Pink, Green and Orange

Nautilus Super Book, White

Nautilus Eggshell, White

Ensign E. F. Book, White

Ensign Sepia and Eggshell White

Everett Soap Wrapper (Alkali Proof), White

"Hard-Wear" Catalog White

Everett Non-Fading Poster, White, Orange

Everett White Wove Envelope

Everett Printing Manila—(Print-craft)

Everett Blanking Paper—White

Label and Lithographic Papers

Litho Poster, White

Everett M. F. Label, White—

Everett Super Label, White—B Finish

Offset Papers—

Seaplane Book (No. 2 Offset) White—Tub Sized

Writing Papers—

Everett Railroad Writing (O. P. S.) White

Everett Penmanship Writing (M Grade) White

Everett No. 4 Opacity Bond, White, Canary, Buff, Blue, Pink, Green, Goldenrod

Everett Stadium Bond, White, Canary, Buff, Blue, Pink, Green, Goldenrod

Mimeograph Papers—

Everett Signwell Mimeo (152X Hard Sized) White Wove, Blue, Pink, Canary, Green

Everett Laid Mimeo (Slack Sized) White, Blue, Pink, Canary, Green

Everett Copiwell Papers (Duplicating Papers) 2 grades—"B" White, Buff, Blue, Pink, Green, Goldenrod; "L" Grade, White only

Tablets and Stationery—

Li-Rite Coil Wire Bound Notebooks, Composition Books, and Commercial Stationery

Tablets, Pads, Composition Books, Notebooks and Fillers
Opaque School Papers
Drawing Papers
White, Detail, Gray and Buff
West Trade Commercial Stationery
West Trade Filing Cards (White and Colors)
West Trade Note Master
West Trade Time Books
West Trade Columnar Pads
Loose Leaf Indexers
Tru Line Wire-o-Bound Line of Note Books, Composition Books, Filler Books, and Sketch Pads
Gray Bogus Paper
Federal Reserve Perforated Pads
Adding Machine and Teletype Paper

F

FERNSTROM PAPER MILLS, INC.

Pomona, California

Products

Citrus Fruit Wraps—Treated and untreated, printed one and two colors of ink, M. F.

Deciduous Wraps (Fruit and Vegetable)—Oiled and unoled, printed and unprinted, copperized, M. G. and M. F.

Napkins—M. G. white menu

Department Store Tissue—Flat and quirefolded, M. F.

Laundry Tissue—Flat and quirefolded, M. G.

Bottle Wraps—Printed and unprinted
Waxing and other tissue specialties

Brands—"Pomona Brand" on fore-going

"Sage Hi-Cap" Plant Protectors

"Protecto" Toilet Seat Covers

FIBREBOARD PRODUCTS Inc.

Port Angeles, Sumner, Wash.

Los Angeles, Stockton, Antioch, Calif.

San Francisco

Products

Boxboards—

Boxmakers Grades

Tagboard

Binders' Board

Kraft and Jute Liners

Corrugating, Rag, Straw and Sulphite Board

Paper Cans: Tubes—

Paper Cans

Coffee Cans

Special Cottage Cheese Cans

Drug Cans

Double "White-Tite" Cans

Paper Caps and tin ends of all descriptions

Mailing Tubes

Telescope Mailing Tubes

Screw Top Mailing Tubes

Kraft Tuck-end Mailing Tubes

Egg Packing—

6x6 Fillers

Egg Cartons, 3x4 and 2x6

"Cushion-Pak" Egg Cartons, 3x4 and 2x6

Egg Case Flats

Folding Cartons

Raisin and Dried Fruit Cartons

Fruit and Vegetable Packing

Fruit and Berry Baskets

Tea and Coffee Cartons

Cereal Cartons

Display Cartons

Frozen Food Cartons

Doughnut Cartons

Butter and Ice Cream Cartons

Miscellaneous Folding Cartons

"Pure-Pak" Milk Containers
 "Tredonia" Bakery Packages
 Bottle Carriers

Corrugated Products—
 Corrugated Rolls
 Photo Mailers
 "Super-Test" Corrugated Shipping Cases
 "Levelbest" Canners Cases
 Milk Cases
 Coffee Cases
 Beer Cases
 Fruit and Vegetable Cases
 Wine Cases
 Glass Cases
 Cannery Cases
 Interior Packing Cases
 Miscellaneous Cases
 Cereal Cases
 Butter Cases
 Display Stands
 Frozen Food Cases

Solid Fibre Products—
 "Super-Test" Solid Fibre Shipping Cases
 "Levelbest" Canners Cases
 Fruit and Vegetable Cases
 Cannery Cases
 Dried Fruit Cases
 Salmon Cases
 Butter Cases
 Interior Packing Cases
 Miscellaneous Cases
 Cereal Cases
 Soap Cases
 Liquor Cases
 Hexagon Asphalt Drums

Pails—
 Food Pails
 Ice Cream Pails

Commodity Folding Boxes—
 Cake Boxes
 Laundry Boxes
 Cake Circles
 Candy Boxes
 Clothing Boxes
 Hat Boxes
 Millinery Boxes
 Collar Bands

Fruit Packing—
 Berry Baskets
 Liners—Corrugated and Chip
 Pads—Corrugated and Unfaced Indent
 Collars
 Fig Trays
 Fig Partitions
 Fruit Baskets
 Peach Shims
 Orange Shims
 Basket Shims
 Shims—Plain and Combination
 Basket Circles
 Labels
 Diagonal Cell Fillers

FIELD-ERNST ENVELOPE CO.
 San Francisco

Products
 Printed and Plain Business Envelopes
 for mailing and filing

FIR-TEX INSULATING BOARD CO.
 St. Helens, Ore.

Products
 Insulating and Acoustical Board
 Fir-Tex Building Board
 Fir-Tex Ivykote Board
 Fir-Tex Finish Plank
 Fir-Tex Insulating Lath
 Fir-Tex Insulating Tile
 Fir-Tex Refrigeration Insulation Blocks

Fir-Tex Roofing
 Fir-Tex Hardboard
 Firkote Sheathing

LLOYD A. FRY ROOFING CO.
 Compton, Calif.
 Portland, Ore.

Products
 Asphalt Roll Roofing
 Asphalt Slate Surface Shingles
 Slate Roll Roofing
 Rag Felt
 Deadening Felt

G

GATES PAPER CO., LTD.

Los Angeles
 Products
 Round Fibre Cans
 All types of round Mailing Tubes
 Paper Cores

GAYLORD CONTAINER CORP.

Oakland
 Products
 Corrugated and Solid Fibre Shipping Containers

GRAYS HARBOR PULP & PAPER CO.

Hoquiam, Wash.
 Products
 Sulphite Bonds
 Mimeograph
 Envelope
 Writing
 Sulphite Specialties

GRIFFIN ENVELOPE COMPANY

Manufacturers
 Seattle
 Products
 Machine Fold Envelopes
 Hand Fold Envelopes
 Envelopes—Plain
 Envelopes—Printed

H

HAWLEY PULP & PAPER CO.

Oregon City
 Products
 Newsprint—
 Standard White
 Rolls and Sheets
 Poster Paper
 Drawing Manila—Standard Colors
 Sulphite Wrapping—
 Cheviot Wrapping in Blue and Green
 Cheviot Bristol in Eight Colors
 Cheviot Mimeo Paper in Colors
 Treated Cheviot Innerwrap
 Cheviot Litewrap
 Cheviot Meat Wraps
 Grocers and Butchers Wrapping
 Treated Moistproof Wrapping
 Sulphite Screenings
 Corrugating Boxboard
 Deciduous and Soft Fruit Wrappers
 Tissue Paper, Unbleached
 Unbleached Toilet Tissues in Rolls
 Towels, Interfolded and Rools for
 Time-Controlled Towel-Craft Cabinets
 Imitation Greaseproof

I

INLAND EMPIRE PAPER CO.
 Millwood, Wash.

Products
 Newsprint—
 Rolls and Sheets
 White, cream, colors
 High Grade News—
 Special halftone and magazine
 print
 No. 1 Colored Poster
 Mimeograph News—
 Laid and wove
 White and six colors
 Sub. 16, 20 and 24
 Coarse Papers—
 Car Linings
 Screenings
 Ham Wrap
 Sheathing
 Bond—
 No. 4 Bond in white and colors
 Mimeo Bonds
 Book—
 Eggshell Book
 English Finish Book
 M. F. Book
 Envelope—
 Fibretint Envelope
 White Wove Sulphite Envelope
 Wrapping—
 Fibretint Wrapping
 Empire Butchers Bleached
 Butchers Sulphite
 Grocers Sulphite
 Fibretint Butchers
 Butchers Manila
 Sulphite and Groundwood Specialties—

J

JAITE PAPER BAG COMPANY

Plants: St. Helens, Ore.
 Wilmington, Cal.
 Offices: San Francisco
 Products
 Multiwall Sewn Paper Bags

JOHNSON ENVELOPE CO.
 San Diego, Calif.

Products
 Catalog Envelopes
 Expanding Envelopes
 File Folders
 Filing Envelopes
 Mailing Envelopes
 Merchandise Envelopes
 Photo Mailers
 Tag Envelopes

JOHNS-MANVILLE SALES CORPORATION
 San Francisco

Materials Manufactured at Pacific Coast
 Factories
 J-M Asbestos Shingles—
 Dutch Lap, Hexagonal
 No. 35 American Method
 American Colonial (507)
 J-M Asbestos Siding Shingles
 Cedargrain
 Texture Shingles
 J-M Rock Wool Home Insulation
 Type A—Loose Wool
 Type B—Full-Thick Bats
 Type B—Semi-Thick Bats

J-M Roofing Materials
 Built-Up Asbestos & Rag Felt Roofings
 Asphalt Shingles
 Smooth Surfaced Roll Roofings
 Slate Surfaced Roll Roofings
 Building Papers—Roofing Felts
 Roof Coatings and Putties

J-M Industrial Building Materials
 J-M Waterproofing Materials
 J-M Celite for Concrete

J-M Power Products
 Refractory Products
 Miscellaneous Power Products
 Transite Flue Pipe
 Transite Pressure Pipe
 Transite Sewer Pipe
 Asbestos Paper
 85% Magnesia Insulation
 Low Pressure Insulations
 High Pressure Insulations
 Insulating Cements
 Insulating Powders
 Insulating Brick
 Filter Aids & Mineral Fillers

L

LAMINATED PAPER BOARDS

San Francisco, Calif.

Products

Laminated Board and Specialty Paper Products

Specialize in the manufacture of Glassine Laminated Boards, which are greaseproof and moisture resistant

W. P. LASS, INC.

Santa Cruz, Calif.

Products

Moulded Wood Fibre Containers

LILY-TULIP CUP CORPORATION

Crystal Division

Los Angeles

Products

Lily, Tulip and Gem Drinking Cups
 Lily and Gem Soda Cups
 Lily and Gem Carry-Out Cups
 Crystal Drinking Cups
 Crystal Souffle Cups
 Crystal Water Bottle Caps
 Lily and Gem Ice Cream Containers
 Tulip Nestrites
 Tulip Nestrite Tubs
 Tulip Souffles
 Lily, Tulip, Gem and Resale Packages
 Lily Straws

LONGVIEW FIBRE COMPANY

Longview, Washington

Products

Sulphate Board

Cylinder Test Liner
 Cylinder Non Test Liner
 Fourdrinier Test Liner
 Cylinder Corrugating Board
 Fourdrinier Corrugating Board
 Cylinder Boxboard
 Kraft Liner for Wrapping Veneer

Wallboard

Board Lined with Kraft Papers
 Duplex Kraftlined Asphalted Board
 Waxed Board

Combined Board

Test Corrugated Sheets, A Flute and B Flute
 Non Test Corrugated Sheets, A Flute and B Flute
 Solid Fibre Sheets

Kraft Paper

Plain and Watermarked, Printed and Unprinted, Natural, Colored, Semi-Bleached and Full Bleached

Machine Glazed

Wrapping
 Bag
 Gumming Kraft
 Tire Wrap
 Bakers' Manila
 Envelope

Fourdriner Machine Finished

Wrapping
 Bag
 Butchers
 Gumming Kraft
 Tire Wrap
 Envelope Kraft
 Multiwall Bag Papers
 Tile Mounting Kraft
 Laundry Manila
 Blue Laundry
 Pattern Paper
 Macaroni Paper
 Drug Bond
 Orange Hardware
 Bakers' Manila
 Brushkraft
 Raisin Tray
 Battery Paper
 Spinning Kraft
 Cheese Curing
 Cartridge

Duplex Asphalted Waterproof Paper

Products
 Sheathing Paper
 Car Liner
 Multiwall Bag Liner
 Asphalted Specialties

Paper Towels

Kraft, Semi Bleached and Full Bleached
 Interfolded Paper Towels—

Singlefold
 Doublefold
 Fourfold
 Singlefold Duplex



U. S. Army Signal Corps Photo.

SHIPPING CONTAINERS carry a tremendous volume of Army supplies. Here in the Jersey City Quartermaster Depot are canned foods for shipment to Army camps.

TWENTY-THIRD ANNUAL
CONVENTION

HOTEL PANTLIND

Grand Rapids, Michigan

JUNE 16-17-18, 1942



Open Forum on

MAINTENANCE *and*
CONSERVATION

IN

Pulp and Paper Mills

Write Hotel for Reservations



THE AMERICAN PULP AND PAPER MILL
SUPERINTENDENTS ASSOCIATION, INC.

Harcraft Paper Towels
Roll Paper Towels
Duplex Roll Paper Towels
Household Paper Towels

Creped Paper Products

Plain Crepe Kraft
Asphalted Crepe Kraft
Waxed Crepe Kraft
Ham Wrap

Waxed Paper Products

Delicatessen Paper
Semi-Bleached
Full Bleached
Lettuce Crate Liners
Newspaper Wrap
Powder Box Liners
Waxed Specialties

Kraft Bags

Plain and Watermarked, Machine
Glazed and Machine Finished, Printed
and Unprinted, Single and Duplex
Walls, Plain, Waxed and Asphalted,
Sewed Creped, Flat, Self-Opening,
Satchel Bottom, Square and Tube Styles

Grocery
Notion and Millinery
Garment
Pants
Barrel
Poultry
Nail
Laundry
Cigarette Carton
Doughnut
Liquor
Shopping
Carryall
Beverage
Bread
Confectionery
Pop Corn
Sugar
Raisin
Prune
Shot
Opaque Drug
Paper Milk Bottle
Dry Ice
Wet Wash Laundry
Coffee
Coffee Shipping Container
License Plate
Chocolate
Can End
Shoe
Ice Cream Bar
Ice Cream Carton
Briquette
Potato
Apple Chop
Bean
Insecticide
Garbage Pail Liner
Insulation
Chemical
Egg Crate Liner
Poultry Box Liner
Date
Beef
Celery
Bathing Suit
Butter Cube

Shipping Containers

Solid Fibre Shipping Containers
Test Corrugated Shipping Containers,
A Flute and B Flute
Non Test Corrugated Shipping Con-
tainers, A Flute and B Flute
Interior Packing

Folding Boxes

Clothing
Laundry
Cake
Pie
Millinery

Blanket
Envelope
Sausage
Display
Lumber End Caps
Shells
Ice Cream Packing Trays
Folding Box Specialties

L. A. ENVELOPE MANUFACTURING CO.

Los Angeles

Products

Business Envelopes
Catalog Envelopes
Special Size Envelopes

LOS ANGELES PAPER BAG CO.

Los Angeles

Products

Paper Bags—

Grocery
Millinery & Notion
Garment
Shopping
Sacks
Liquor
Sanitary Napkin
Carton

Bag printing of all kinds.

M

MEKAN-I-KLOTH COMPANY

Bellingham, Wash.

Products

Mekan-i-Kloth—
Soft Wiping Tissue
Substitute for Rags
Grease Absorbent
Sanitary-Disposable
All Ways a clean cloth

N

NATIONAL CARD, MAT & BOARD COMPANY

Los Angeles

Products

Artists Illustration Board
Backing Board
Embossed Boards
Linen Finish Boards
Calendar and Photo Mounts
Card and Mat Board Products
Coated Board
Cover Papers
Display Cases and Easels
Greeting Card Stock
Illustration Boards and Bristol
Paper Board Specialties
Pasted Board
Picture Backing Board
Poster Board and Paper
Box Cover Papers
Checkbook Cover
Cover Paper Decorated
Cover Paper Embossed
Foil Papers
Melton Mounts
Memo Book Cover
Mount Boards
Camera Club Mount Boards — Plain
and Cut-out

NORTHWEST ENVELOPE MFG. CO.

Seattle

Products

Envelopes—Plain and Printed

O

OREGON PULP & PAPER CO.

Salem, Ore.

Products

White and Colored Bond
Writings
Envelope, White and Colored
Ledger
Mimeograph, White and Colored
Glassine, greaseproof, Innerwrap—
Bleached and unbleached
Specialties
Manifold Parchment

OWENS-ILLINOIS PACIFIC COAST COMPANY

San Francisco

Products

Corrugated Shipping Cases (1)
Corrugated Fruit Box Pads
Liners and Collars (2)

Brands

(1) OnIzed
(2) No-Bruz

P

PACIFIC COAST ENVELOPE CO. DIVISION

San Francisco

Products

Printed and plain envelopes for mail-
ing and filing

PACIFIC COAST PAPER MILLS

Bellingham, Wash.

Products

Toilet Tissue—
Bleached and unbleached roll
Interfolded and Flat Pack

Mekan-i-kloth

Napkins—

White, embossed,
Flat, quarter-fold
Dispenserfold

Sanitary Napkins

Towels—

Unbleached Sulphite

Brands

"M. D." Tissue
"M. D." Sanitary Napkins

PACIFIC COAST PULP & PAPER CO.

Richvale, Calif.

Products

Rice Straw Toweling

PACIFIC MILLS, LIMITED

Ocean Falls, B. C.

Products

Converting Plant, Vancouver, B. C.
Newsprint
Kraft Pulp
Sulphite Pulp
Kraft paper, M. F. and M. G. plain
and striped
Butchers Manila
Sulphite tissues
Toilet tissue
Napkins
Fruit Wraps
Towels
Bread Wraps
Printed Wrapping
Plain and printed waxed papers
Solid Fibre Shipping Cases
Gummed Kraft and Sulphite Tape—
Plain and Printed

PACIFIC NORTHWEST PAPER MILLS

Division of Columbia River Paper Mills
Portland
Products

Safety Paper
Adwrap Decorated Wrappings
Specialties

PACIFIC ROOFING CO.

Portland, Oregon

Products

Roll Roofing Felts, Building Papers,
Roof Coating and Asphalt
Complete line of Roofings—Shingles,

PACIFIC PAPERBOARD COMPANY

Longview, Wash.

Products

Combination Board
Plain Chip Board
Solid News
News and Manila Lined
Bleached Manilas
Mist Gray and Colored Boards
Container Board
White Patent Coated Board
Solid Pulp Board
Egg Case Filler
Folding Boxes
Wax Lined Food Trays
Sheet Lined Boards
Frozen Food Locker Cartons

PACIFIC WAXED PAPER CO

Seattle, Wash.

Products

Printed Waxed Paper—
Bread Wrappers
Candy Bar Wrappers
Frozen Fruit & Vegetable Wrappers
Transparent Cake Wrappers
Adsealit Bands
Plain Waxed Paper
Waxed Glassine
Transparent Cake Wrappers
Vegetable Crate Liners
Delicatessen Paper
Bags—Plain and Printed
Glassine—Waxed and Unwaxed
Cellophane
Window Bags
Dry Waxed Bags
Laminated Bags
Specialty Bags of All Kinds
Hot Cap Paper
Pacific Hot Houses
Tredonia Moistureproof Show Case
Boxes with Cellophane windows for
doughnuts, sweet doughs, layer
cakes, and bakery products of all
kinds

PALMER-BINGHAM ENVELOPE CO.

606 E. 12th St.
Los Angeles

Products

Greeting Card Envelopes
Wedding Announcement Envelopes
Baronial Type Envelopes
Commercial Envelopes

PAPER SUPPLY CO.

Los Angeles

Products

Resale Rolls of—
Shelf Paper
Tissue Paper
Holly Paper
Decorative Wrappings

Distributors:

Ribbons, Plain Colors or Decorated
for every use
Glassips Cellophane Soda Straws,
all colors for hot or cold bev-
erages

PARAFFINE COMPANIES, INC.

Emeryville, Calif.

Products

Asbestos Siding Shingles
Mineral-Surfaced Shingles
Thermoslab (thick roof slabs)
Roll Roofings

Mineral-Surfaced Roofings

- a. P & B
- b. Malthoid
- c. Durable
- d. Smooth-Surfaced
- a. P & B
- b. Malthoid
- c. Durable
- d. Santo
- e. Paramount
- f. Raintite

Aluminum Roofings

- a. Pabco Alumi-Shield

Building Papers

1. Urban Sheathing
2. P & B Light Bldg. Paper
3. Doublekraft
4. P & B Heavy Bldg. Paper
6. 15-lb. Felt
7. Pabcotite

Commodities

1. Asphalt Roofing Felt
2. Asphalt Sheathing Felt
3. Deadening Felt
4. Blue Plaster Board
5. Plaster Lath
6. Rosin-Sized Sheathing

Roof Coatings and Plastics

1. Vitalized Fibre Roof Coating
2. Plain Fibre Roof Coating
3. XXX Coating
4. Pabcobond No. 1072
5. Hydroseal
6. Lap Cement
7. Gutter Paint
8. Floatine
9. Roofing Asphalt

Car Linings

Red Liner

Mulch Papers

Pipe Wrappings

Fibre Wallboards

Rock Wool

"Grip-Tread" Mastipave Industrial

Floorcovering

Brands

Pabco Brands on all

PATERSON PACIFIC PARCHMENT COMPANY

San Francisco

Products

Patapar Vegetable Parchment—Plain,
Printed, Waxed and Creped
Durapak Insoluble Crate Liners and
Wet Strength Paper—Plain, Printed
and Rippled

Parchkin Art Parchment

Patapake and Patawite Printing Paper

Patawite Manifold Paper

Waxed Ice Cream Can Liners

Waxed Paper

PERFECTION TWINE CO.

Camas, Wash.

Products

Specialty Bags—

Mattress Proof Containers

Mattress Bags

Casket Covers

Multi-wall Bags

Specialty Shipping Bags

Furniture Bags, etc.

Paper Twines and Cords—

Seaming Twines

Fleece Twines

Handle Cord Twine, etc.

Molded Fibres

Tacking Strips

PIONEER DIVISION THE FLINT-KOTE COMPANY

P. O. Box 2218, Terminal Annex
Los Angeles, Calif.

Products

Roofing Division

Asphalt Roofing—Dry Felt, all weights,
12 to 108 lbs.

Asphalt Mineral Surfaced Shingles

Asphalt

Asphalt Emulsion

Asbestos Shingles and Siding

Rosin-sized Sheathing

Corrugated Asbestos

Blue Plasterboard

Insulating Papers

Insulation Board

Asphalt Paints, Plastic Cement, Flash-

ing Compound

Hardboard

Mulch Papers

Pipe Wrap Coverings

Car Lining Papers

Duplex Kraft Sheathing

Asphalt Saturated Felt

Camouflage Paints

Industrial Coatings

Box Board & Container Division

Pioneer Super White Patent Coated

Boxboard

Pioneer Super Manila

Pioneer Super Mist Grey and all colors

Pioneer Super Suit Box Boards

Pioneer Super Poster Card Board

Pioneer Black Ebonkote Board

Pioneer Show Print Board

Pioneer Solid News Board

Pioneer Kraft Board Liners

Pioneer Jute Board Liners

Pioneer Pasted Chip

Pioneer Colored Manila Lined Boards

Pioneer Bleached Manila Lined Boards

Pioneer Book Lined Chipboard

Pioneer News Lined Chipboard

Pioneer Shirt Boards

Pioneer Division Boards

Pioneer Fruit Box Liners

Pioneer Fruit Box Shims

Pioneer Kraft Metal Lath Backing

Pioneer Plaster Board Liner (kraft)

Pioneer Corrugated Containers

Pioneer Corrugated Partitions

Pioneer Corrugated Beer Cases

Pioneer Corrugated Cannery Cases

Pioneer Corrugated Shipping Cases

Pioneer Corrugated Export Cases

Pioneer Corrugated Display Cases

Pioneer Corrugated Display Stands

Pioneer Single Faced Corrugated Rolls

Pioneer Solid Fibre Containers of all

kinds

Pioneer Solid Fibre Display Cases and

Stands

Pioneer Solid Fibre Partitions

Folding Box Division

Cloak and Suit Cartons

Dog Food Cartons

Sausage Cartons

Breakfast Cartons

Cracker Cartons

Cookie Cartons

Set-up Box ex

Candy

Department Store

Hat and Millinery

Trousseau

Funeral Urn Boxes

PIONEER WRAPPING & PRINTING CO.Los Angeles
ProductsGift-Wrap Holiday Wrapping Papers
Printers of Cellophane and other Food Wrappers

Printers, Converters and Distributors of Plain and Fancy Wrapping Papers for the Holiday trade

POMONA PAPER PRODUCTS, INC.Pomona, Calif.
ProductsWaxed Paper Rolls in Cutter Edged Boxes
Paper Napkins for home use**POWELL RIVER CO., LTD.**

Powell River, B. C.

Products

Newsprint
Unbleached Sulphite Pulp
Laminated Papers**PUGET SOUND PULP & TIMBER COMPANY**

Bellingham, Wash.

Products

Unbleached Sulphite Pulp

R**RAYONIER INCORPORATED**

San Francisco, New York and Seattle

Mills at:

Fernandina, Florida
Hoquiam, Washington**ON - to
VICTORY!**

The great army of Puget
Power marches on to pre-
serve those fine American
ideals which it has always
stood for and fought for.

**PUGET SOUND POWER
& LIGHT COMPANY**Port Angeles, Washington
Shelton, Washington
Tacoma, Washington
Products

Dissolving Pulp for the manufacture of: rayon, staple fibre, cellophane, cellulose acetate, cellulose nitrate, etc.

Specialty Pulp for the manufacture of: munitions, plastics, cellulose, impregnated products, vulcanized fibre, welding rods, etc.

Bleached Sulphite Pulp for the paper industry

Paper—Sulphite bond, pasting ledger, writing, mimeograph, envelope and specialties

ROYAL CONTAINER CO.

Milbrae, Calif.

Products

Corrugated Shipping Cases

Corrugated Rolls

Corrugated Specialties

Royal Wrap

Paper Excelsior

Paper Excelsior Packing Pads

Fruit Packs and Wraps

Embossed Packing

Single, Double Wall and Laminated

Paper Bags—

For Shipping Mattress, Furniture and Caskets

Miscellaneous Handmade Bags

Confetti

S**ST. HELENS PULP & PAPER CO.**

St. Helens, Ore.

Products

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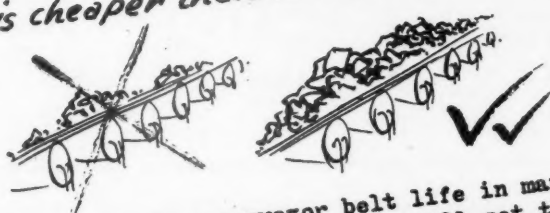
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